

Kriya Sareeram

It is proposed to divide the 1-½ years of professional course into three terms as envisaged by DAME. The three terms, study leave & periodical exams can be as follows:

Term 1 : Classes for 6 months, including examination & result

Term 2 : Classes for 6 months, including examination & result

Term 3 : Classes for 4 months including model examination & result.

Study leave + University Exam for 2 months

University Examination process 2 months

Total : 18 months

- Terminal exams should include viva.
- Examinations should be completed within the period of 18 months as stipulated by CCIM
- Third terminal exam may be conducted as model exam.

The syllabus is moduled with hours for teaching, according to which distribution of teaching hours is calculated.

Rearrangement of syllabus for 3 terms

Term Theory modules & topics Theory hours Practical topics

I Paper I Part A Modules 1,2,3,4,5,6,7 Paper II Part A Module 2 Topics
: Introductory aspects of Physiology and Basics of Kriyasareera, Prana, Udana, Vyana, Rakthadhathu. Respiration, speech, blood etc. 71 Please see Annexure – II Topics: Blood including biochemistry, Prakrithy/sara/dosha/dhathu/mala pareeksha

II Paper I Part B Module 8 Paper II Part A Mod-1,3,4,5,6,7,8,9,10 Topics
: Samana Vayu, Apana Vayu, Apana Vayu, Rasa Dhathu, Mamsa-Medo-Asthy-Majja-Shukla-Dhathus, Ojus, Upadhathus & Malas Digestion, muscles, lipids, Ossification, Reproductive physiology, R.E. System, Immunity, lactation, skin, menstrual cycle, renal and excretory physiology etc. 71 Please see Annexure – II Topics: Same

as above

III Paper II Part – BMod-11,12,13 & 14 Topics: Jnanendriyas, Thanthrasareera, Manas, Grandhy Sansthana Physiology of Special senses, mind, sleep, dreams, Physiology of nervous system including brain & Spinal Cord, Endocrine system and each endocrine gland. 68 Please see Annexure – II Topics: System wise Examination including Urine Examination Normal Values Study of Equipments

3. Distribution of teaching hours

At present, in most colleges, every week, 12 hours are devoted for theory and 4 hours for practical. So, in the first professional BAMS Course, 78 weeks of classes (18 months) means 938 theory hours and 312 practical hours. (Practical hours are roughly 33% of theory hours).

Paper presentation: Weekly one presentation. Each student should present the topic given to him/her on the last hour of the department of the week. All teaching staff of the department should attend the presentation and provide suggestions. (See item No.7, Topics for Paper presentation/assignment)

Assignment: 3 nos., one at the end of every term. Entire student strength of the class should be divided into three and each group should be given one assignment to be prepared in hard copy and soft copy. The topic should be of utmost relevance. The topics can be either selected from the list of topics for paper presentation or else, it can be selected from the syllabus modules. (See item No.7, Topics for Paper presentation/assignment)

4. Distribution of marks

Marks for theory :Paper I and II, Divided into Papers A&B carries 50+50=100 x2=200(The system followed now).

Marks for practical and Oral Examinations: In various Universities of Kerala, this is followed different. The common consensus arrived at the workshop is briefed below.

Total marks for practical=150, Total for Oral examination = 50, Grand

total for practical and oral=200.

Splitting of Practical marks

Record	:	20
Class Schedule Card	:	10
Blood main (TWBC, TRBC, DLC, ESR etc.)	:	40
Short tests (Hb, BT, CT., Grouping, BP, Temp. etc.)	:	20
Urine Routine (all non-microscopic exams)	:	20
Specimen identification	:	20
Prakruthi/Sara etc. self-assessment	:	20

(Note: The marks for blood main is calculated thus: Microscope arrangement-10, Procedure -10, Preparation of specimen-10, Accurate value-10)

5 &13. Restructuring of Question Paper & Methods for evaluation

1. Questions has to be asked from Ayurvedic and Modern portions.
2. When questions from Modern Physiology are asked, the appropriate modern terminology should be clearly mentioned.
3. Questions should be asked in the following format, mark wise:
 - a) MCQ'S (Multiple Choice Questions) - 40%
 - b) SAQ'S (Short Answer Questions-One word or One sentence answers) - 40%
 - c) Essay type questions - 20%
4. Essay questions should be asked in such a way to kindle the academic intelligence of the students, i.e, the rationale of the answer should also be given importance. (Ex. What is the rationale of Vata's division of Apana Vatha? State with the help of modern neurophysiology.)
5. As far as possible, answer key should be supplied to examiners and the examiners asked to value papers based on points answered.
6. When papers are set, due importance should be given to the

importance of the topics. Those questions should be asked from topics of current relevance and topics of essential basics. Thus, even an average student would have an above average knowledge about important topics.

6. Model Question Paper

Please see Annexure – 3

7. Topics for Paper presentation/assignment

1. Dhadhus, their classification and functional importance of each dhadhu.
2. Panchabhootas – their origin, classification and functional importance.
3. Regulation of respiration at neural and chemical levels.
4. Cardiac Cycle - heart sounds, mechanism of genesis of murmurs. Cardiac failure.
5. Description of Pakagni, Jataragni, Bhoothagni, Dhatwagni.
6. Formation of Lymph, its composition, functions and its circulation – edema.
7. Formation of blood, site, functional aspects of blood vessels.
8. Blood clotting factors and mechanism.
9. Muscle Tissue – types, properties, functions, mechanism of muscle contraction.
10. Description of Asthy Dhatu, its origin, presentation, interdependence of Vatha and Asthy Dhathu.
11. Bone Tissue – Ossification, composition and divisions.
12. Bone Marrow – Properties functions, types – formation of Hb.
13. Testis – functional anatomy, counter current heat exchange mechanism – formation of semen.
14. Mechanism of erection and ejaculation – hormonal and neural control.
15. Presentation and classification of Ojas – its site, properties and importance.

16. Upadathoos - Formation, number, properties and functions.
17. Breast milk – hormonal factors in the production and neural factors in the secretion of breast milk, contents and importance.
18. Menstrual Cycle and its regulation. Stages of events involved in menstrual cycle
19. Physiology of pregnancy, function of placenta, placental hormones – pregnancy tests.
20. Origin of important malas such as Pureesha, Moothra and Sweda, their sites and functions.
21. Feces – formation, water absorption from gut, colon, composition, odour, movement and expulsion.
22. Urine – formation. Urine in maintenance of homeostasis.
23. Sweat – production and hormonal control by ANS, hypothalamic control, importance in body temperature regulation.
24. Structural elements of retina, its 10 layers retinal cycle – perception of vision.
25. Physiology of hearing, transmission of sound waves.
26. Mechanism of olfaction, olfactory epithelium – receptors – Sustentacular cells, Olfactory rods, pigment and contents.
27. Mechanism of taste perception, pathway for taste.
28. Description of ANS and CNS. Description of various sensory and motor pathways and centers.
29. Manas and its various aspects. Relationship of Manasika doshas and Sareerika doshas – their supremacy.
30. Endocrine glands – Definition of hormones, chemical nature of function, para hormones, regulation of secretion by hypothalamus - hypophysial portal system.

8 Essential list of equipments and instruments

1. Microscope - 40
2. Binocular microscope - 2

3.	Centrifuge	-	4
4.	Stethoscope	-	40
5.	BP apparatus	-	40
6.	Urinometer with its jar	-	40
7.	Spirometer	-	4
8.	Haemometer	-	40
9.	Counting chamber	-	40
10.	ECG apparatus with Interpretation	-	2 Nos.
11.	Wintrobe's Haematocrit tube	-	20
12.	Thermometer	-	20.
13.	Microtome	-	1
14.	pH meter	-	2
15.	Calorimeter	-	2
16.	Kymograph	-	2
17.	Refrigerator	-	1
18.	Distillation Unit	-	1
19.	Serological Water Bath	-	1

9 & 10 Record of Practical

1. Study of Microscope
2. Blood – Microscopic examination – Hypotonic- Hypertonic-Isotonic
3. Hemoglobin
4. Grouping
5. Bleeding time
6. Clotting Time
7. Packed Cell Volume

8. Total RBC
9. Total WBC
10. Differential WBC Count
11. ESR
12. Mean Corpuscular Volume.
13. Biochemistry (Demonstration) + (Record)
 - a. Sugar
 - b. Lipid profile
 - c. Triglycerides
 - d. Proteins, A.G. Ratio.
14. Relevant Ayurvedic portion (Chart attached)– Estimation of
 - a. Prakruthy
 - b. Sara
 - c. Dosha
 - d. Dhathu
 - e. Malas
15. Examination of body temperature
16. Examination of Respiratory system:
 - a. General examination
 - b. Spirometry
 - c. Peak Flow Meter
17. Examination of Cardio vascular system:
 - a. General examination
 - b. Pulse, Peripheral pulse spotting
 - c. Blood Pressure Measurement
 - d. Surface anatomy of auscultatory areas & Heart sounds

- e. ECG. (Demonstration)
- 18. Examination of Nervous system:
 - a General examination
 - b Deep tendon reflexes
 - c Superficial reflexes
 - d Testing of sensation
 - e Examination of cranial nerves including fundus examination by ophthalmoscopy and use of tuning fork (Demonstration).
- 19. Examination of urinary system
 - a General examination
 - b Urine examination
 - 1. Physical (Specific gravity and color)
 - 2. Chemical (pH, sugar, albumin, Ketone bodies, Bile salts, Bile pigments, Occult blood.)
 - 3. Microscopic (Pus cells, RBC, Oxalates, epithelial cells)
- 20. Study of equipments and components
Kymograph, Centrifuge apparatus, Distillation unit, Catheter
(No diagram necessary, only brief data)
- 21. Study of normal values (Chart attached)
- 11. Not applicable**
- 12. Please see annexure – 3.**

Annexure – 1

PROPOSED MODIFIED SYLLABUS FIRST B.A.M.S.

KRIYA SAREERA

Goal: Comprehensive knowledge of the normal functions of Doshas, Dhathoos, Upadhatoos, Srothases, Indriyas, Malas, Prakruthy etc. as also the normal functions of organ systems of body. To facilitate understanding of the physiological

basis of health and disease.

Objectives: The student should be able to explain the normal functioning of body for well-coordinated medical practice. This should be in applied liaison with traditional Ayurvedic knowledge and integrated with current knowledge of modern physiology. The student should be conversant with various tests and their results observed in laboratory. He/she should also be having good knowledge about the regulatory mechanisms of human body.

Duration of the course	:	18 months
Total No. of hours	:	300 hrs.
Theory	:	210 hrs.
Practical	:	90 hrs.

(Practical includes 18 hrs. innovative session – which consists of Seminars / assignment, structured discussion, integrated teaching, evaluation / revision)

PAPER I

PART – A

Module 1. - 4 Hours

Introduction to Kriyasareera – fundamental principles

Definition of the word, Sareera. Synonyms of the word, Sareera. Definition of the word, Saareeram and Kriya. Purusha & Prapancha, Panchabhoothas, their origin, classification & functional importance.

Detailed knowledge of Sareerika & Manasika doshas. Definitions, peculiarity, properties, functions, sites classification. Kshaya & Vridhy. Functional importance of each type of classification of doshas.

Details knowledge of Dhathoos, their classification & functional importance of each dhathu, Upadhatoos, their functional importance.

Srothases, their classification & functional importance.

Malas, their classification & functional importance.

Indriyas, their classification & functional importance.

Prakruthy, its classification & functional importance.

Module 2 - 2 Hours

Introduction to Physiology

Homeostasis, Body fluid compartments – Intra cellular & extra cellular [Intra vascular & Extra vascular – peritoneal, pleural, synovial, pericardial, CSF, endolymph, aqueous humor], level of organization at chemical, cellular & tissue level.

Module 3. - 3 Hours

Biophysics & applied aspects

Filtration, Ultra filtration, diffusion, osmosis, surface tension, dialysis, adsorption, hydrotropy, colloid, Donnan equilibrium and their physiological importance with examples.

Module 4. - 1 Hour

Bio chemical Applications

Buffer, pH, acid-base balance etc.

Module 5. - 19 Hours

Specific functions of Prana Vayu.

Prana Vayu is the main force of life. It is the source of energy for all activities. It is the force that moves the blood and lymph. It is the force that moves the food and water. It is the force that moves the air and the sound. It is the force that moves the light and the heat. It is the force that moves the mind and the soul. It is the force that moves the universe.

(Swasa & Praswasa. Knowledge of Prana-vaha srothas. Knowledge of swasanapadha, control of blood flow & respiration by vatha. Swasa avarodha. Artificial respiration. Greatness of pranayama. Residual vatha in srothas).

Relevant Physiological aspects & Concerned applied aspects

Physiological anatomy of the respiratory tract. Definition & Physiology of respiration. Lung volume and capacity. Ventilation, control of ventilation and mechanics. Pulmonary circulation, capillary dynamics. Gaseous exchange. VA/Q ratio. Transport of O2 and CO2 by blood and their exchange at tissue level. Residual volume. Regulation of respiration at neural and chemical levels. Lung defense mechanisms [respiratory adjustments], age related changes, Asphyxia, respiratory arrest, artificial respiration, pulmonary edema, Left sided heart failure, fluids in pleural cavity, pneumothorax.

Module 6. 2 Hours

Specific functions of Udana vayu.

नमोऽस्तुते वायुभ्योः प्रथमोऽयं उदानोऽन्तर्निहितः ।
 तस्यैवाहोरात्रं चोदितं चोदयति ।
 तस्यैवाहोरात्रं चोदितं चोदयति ।

(Dwanyatmaka and varnatmaka aspects of sound. Exposure to larynx. The origin & control of word/speech.)

Relevant Physiological aspects & Concerned applied aspects.

Origin and control of speech. Broca’s area and Wernicke’s area. Cerebral dominance. Coherent speech, internal speech, aphasia-sensory, motor and global types, dysarthria. Physiological anatomy of the larynx.

Module 7. - 20 Hours

Specific functions of Vyana vayu

नमोऽस्तुते वायुभ्योः तृतीयोऽयं व्यानोऽन्तर्निहितः ।
 तस्यैवाहोरात्रं चोदितं चोदयति ।
 तस्यैवाहोरात्रं चोदितं चोदयति ।

(Movement of Rasa & Raktha helped by Hrudaya. Study of Hrudaya.

The vatha dosha which is based at hrudaya. Hrith karya chakra. Hrudaya dhvani vaividhya. Hruth gathi varnana. It's control. Hruth karya avaraodha. Rakthamapa. Knowledge of nadees.)

Relevant Physiological aspects & Concerned applied aspects.

Circulation of blood and lymph by the help of heart. Functional anatomy of the heart. Properties of heart muscle. Heart as a pump. Blood Pressure. Rhythmical excitation.

Normal ECG, history, basic principles, typical ECG pattern, details of recording different types of leads, abnormal ECG pattern in myocardial infarction, cardiac arrhythmias & Heart Block.

Heart rate and its regulation. Nervous control, Vagus control Cardiac cycle, Cardiac output – during rest and exercise, haemodynamics, cardio-vascular reflexes, control mechanisms.

Blood pressure. – Definition, normal value, variations, determinants of blood pressure, Regulation of BP, Local and systemic mechanisms – both neural and hormonal

Pressure-flow-resistance, vascular distensibility, origin and conduction of cardiac impulse, cardiac cycle, Heart sounds, Mechanism of genesis of murmurs. IHD, Valvular congenital/acquired defects, circulatory shock, Cardiac failure, and arrhythmia.

Regional Circulation – Coronary, cerebral renal, Hepato-portal, fetal, Cutaneous, splanchnic.

Systemic & pulmonary circulation – [Greater & Lesser]

Cardiac catheterization, abnormal pace makers.

Part – B

Module 8. 15 Hours

Specific functions of Samana Vayu & Apana Vayu

(Nutrition of the body. Panchamahabhootatwa of various foods, 'Rasa' aspect of Ahara dravyas, classification of food substances, Classification according to swaroop, composition of ahara dravyas & properties and functions. Description of symptomatology of Jeevaniya Tatwa Kshayavasta. Ahara parinamakara bhavas. Description of Pakagni, Jadaragni, bhoothagni, dhatwagni. Vipaka. Functions of Yakrit. Functions of Agnyasaya & Pleeha. Digestion with the help of Dhantha, Jihwa and Lala grandhy, Grasanika, Mahasrothas & its attached organs, their physiology Avasthapaka. Sara kitta vibhajana, origin of doshas from food, formation of dhathoos with various nyayas, dhathu paka kaala.)

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(Nutrition of the body. Panchamahabhootatwa of various foods, 'Rasa' aspect of Ahara dravyas, classification of food substances, Classification according to swaroop, composition of ahara dravyas & properties and functions. Description of symptomatology of Jeevaniya Tatwa Kshayavasta. Ahara parinamakara bhavas. Description of Pakagni, Jadaragni, bhoothagni, dhatwagni. Vipaka. Functions of Yakrit. Functions of Agnyasaya & Pleeha.

Digestion with the help of Dhantha, Jihwa and Lala grandhy, Grasanika, Mahasrothas & its attached organs, their physiology

Avasthapaka. Sara kitta vibhajana, origin of doshas from food, formation of dhathoos with various nyayas, dhathu paka kaala.)

Relevant Physiological aspects & Concerned applied aspects.

Food and nutrition. Metabolism of carbohydrates/glucose, lipids, proteins, Vitamins, Symptoms of vitamin deficiency. Phospholipids. BMR, energy expenditure, anabolism, catabolism.

Physiological role of teeth, tongue and salivary glands in digestion.

Saliva – composition and function. Digestive process in esophagus, stomach and its secretions [Composition and functions, HCl. secretion and factors affecting it], duodenum [mucosal barrier and peptic ulcer], ileum, colon, pancreas [pancreatic function tests] liver[enterohepatic circulation of bile salts , jaundice, liver function tests etc.] movement of alimentary tract, vagal control, differentiation of feces from digested food, water absorption, absorption of carbohydrates, fats, proteins, vitamins, essential minerals, etc. Portal vein and its relation to liver functions. Functions of liver and formation with storage of bile, splenic functions, and pancreatic enzymes. Each in detail. Gastro-intestinal hormones, APUD cells.

Enteric Nervous System, Conditioned and unconditioned reflexes.

Movements of GIT – Peristalsis, migrating myoelectric complex, mastication. Gastric movements – types, gastric emptying, vomiting.

PAPER II

PART – A

Module 1. - 4 Hours

Rasa dhathu

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(Description of the formation of Rasadhathu from food. Functional aspects of sruthases of rasa dhathu. Site, properties and functions of rasadhathu, its presentation in vrudha avastha and ksheena avastha. Quantification of rasa dhathu. Narration of ashta vidha saaras. Presentation of twak sara purusha. Flow and transport of rasa dhathu.)

Relevant Physiological aspects & Concerned applied aspects.

Tissue fluid formation, capillary exchange, Starling hypothesis, Formation of lymph, its composition, functions and its circulation, edema, functional anatomy of lymph node. Exchange of blood and nutrients, microcirculation, interstitial fluid, pump mechanism, valves, hydrostatic pressure, protein return, and chylomicron transport. Study of functions of spleen and of lymph as part of Reticuloendothelial system.

Module 2. - 20 Hours

Raktha dhathu

രക്തധാതുവിന്റെ ഉത്ഭവം, രക്തധാതുവിന്റെ രാസസംയുക്തം, രക്തധാതുവിന്റെ ഭൗതികഗുണങ്ങൾ, രക്തധാതുവിന്റെ പ്രാഥമിക ഘടകങ്ങൾ, രക്തധാതുവിന്റെ പൈതൃകം, രക്തധാതുവിന്റെ അളവ്, രക്തധാതുവിന്റെ പ്രവർത്തനം, രക്തധാതുവിന്റെ രോഗങ്ങൾ, രക്തധാതുവിന്റെ പരീക്ഷണം, രക്തധാതുവിന്റെ ഗുണഭോക്താക്കൾ.

(Origin, site of raktha dhathu and physiological properties of raktha vaha srothas. Rasa raga by ranjaka pitha, sudha raktha lakshanas, specific properties of raktha and its physiological role. Lakshanas of raktha sara purusha.)

Relevant Physiological aspects & Concerned applied aspects

Formation of blood, site, functional aspects of blood vessels, Hb., Specific functions of blood, Composition, genesis of various blood cells, coagulation, various blood groups, their discovery, Landsteiner's laws, ABO system, importance, incompatibility, Rh. Factor, antigens, cross matching, Anemia-types and causes, polycythaemia.

R.B.C. Morphology, composition, functions, erythropoiesis, metabolism, E.S.R., life span, fragility, folic acid, iron.

Hemoglobin - functions, concentration, properties, chemistry, metabolism, fate, jaundice.

Leukocytes – TC, DC, Morphology, Kinetics [pools], functions, inflammation, leucopenia, leukemia.

Lymphocytes – origin, types.

Platelets – Count, morphology, development, and function. Plasma proteins

Module 5. - 2 Hours

Asthy dhatu

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(Description of Asthy dhatu, its origin, presentation, interdependence of vatha and asthy dhatu. Physiology of asthy vaha srothas, presentation of asthy sara purusha and asthy kshaya and vridhy.)

Relevant Physiological aspects & Concerned applied aspects.

Bone tissue – Ossification, composition, divisions [bone cells 4 types], bone matrix, Calcium metabolism, parathyroid hormone, dietary requirements, Calcium balance, functions, and role of parathyroid gland, Vita. D, Calcitonin, Magnesium and phosphorus.

Module 6. - 2 Hours

Majja dhatu

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(Description of Majja dhatu, origin, presentation, properties, functions, site, presentation of majja sara purusha, majja dhatu vridhy and kshaya.)

Relevant Physiological aspects & Concerned applied aspects.

Bone marrow -properties, functions, types, sites, composition, formation of Hb., Iron metabolism, regulation of blood cell production and the role of erythropoetin, B- lymphocytes, intrinsic factor + B12, leukemia – myeloid types.

Study of bone marrow as part of Reticuloendothelial system.

Module 7. - 5 Hours

Shukla dhatu

शुकलधत्तुः शुकलधत्तुः : शुकलधत्तुः शुकलधत्तुः शुकलधत्तुः शुकलधत्तुः शुकलधत्तुः शुकलधत्तुः
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(Description of Shukla dhathu with origin, site, functional aspects of its strotshases, its presentation, lakshanas of shukla sara purusha.)

Relevant Physiological aspects & Concerned applied aspects.

Male reproductive physiology – testis-functional anatomy, counter current heat exchange mechanism, epididymis, Vas deferens, prostate, seminal vesicles, formation of semen, its composition – chemical and microscopic, maturity of sperms, mechanism of erection and ejaculation – hormonal and neural control, role of chromosomes in fertilization, infertility, cryptorchidism, sterility, Leydig cells, Sertoli cells.

Module 8. - 4 Hours

Ojus

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ओजुः ओजुः ओजुः *

(Presentation of ojus, classification [types], quantity, properties, site, importance, its description, Description of bala, classification, vyadhy kshamatwa.)

Relevant Physiological aspects & Concerned applied aspects.

Immunity – introductory aspects, innate and acquired, Complement system – antigens - antibodies, role of thymus, Helper T cells, cytotoxic T cells and B lymphocyte system, lymphocytes-types, cell mediated and humoral immunity, tolerance, allergy and hypersensitivity, immunoglobulins [types].

Inflammation – Def., causes, cardinal signs, 1st, 2nd, 3rd, 4th, line of defenses, Phagocytosis, TNF,

Interleukin-I, GM-CSF, G-CSF, M-CSF.

Lymphocytes – origin, types – T-Lymphocytes, clone, memory, applied physiology – tissue rejection, autoimmune diseases and immunodeficiency, AIDS.

Module 9. - 12 Hours

Upa dhathoos

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(Upa dhathoos – Formation, Number, peculiarities, properties and functions. Origin and types of aarthava, aarthava chakra, details about the origin of various layers of skin and its functions; Further details about Sthanyam, Aarthavam, Twak, Kandara, Sira, Vasa, Snayu)

Relevant Physiological aspects & Concerned applied aspects.

Breast milk – hormonal factors in the production and neural factors in the secretion of breast milk, contents, and importance.

Physiology of female reproductive system- genetic basis of sex, sex chromatin, role of hormones in sex differentiation, gonadotropins, prolactin, menstrual cycle and its regulation, ovarian cycle, uterine cycle, cervical cycle, estrous cycle, ovarian hormones, ovulation, hormones and stages of events involved in menstrual cycle, fertilization, physiology of pregnancy, function of placenta, placental hormones, pregnancy tests, contraception and its physiological rationale, induction of ovulation, infertility, in vitro fertilization, chorionic villus, GIFT and other methods of correction of infertility, fetal circulation and childbirth.

PART – B

Module 10 - 13 Hours

Malas

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(Types of malas – ahrajanya and dhathu parinama janya, origin of important malas such as pureesha, moothra and sweda, their sites, functions; functional aspects of vrikka, vasthy and moothra vaha srothas.)

Relevant Physiological aspects & Concerned applied aspects.

Feces: formation, water absorption from gut, colon, composition, odor, movement, and expulsion.

Urine: Formation [glomerular filtration, tubular reabsorption, tubular secretion], urine in maintenance of homeostasis, concentration, electrolyte balance, dilution, ADH effect, free water clearance, osmolarity, osmolar clearance rate, volume of urine, water output, urobilinogen, excretion of metabolic wastes and foreign chemicals, acid - base balance, hormonal involvement – renin-angiotensin, aldosterone, nor epinephrine, epinephrine, prostaglandins, glucocorticoids, erythropoetin, Vit. D3, Cardiac output and renal blood flow, Sodium concentration and its extra cellular regulation, potassium, calcium, magnesium concentrations, BP, control of thirst, action of diuretics, micturition and its physiological aspects including neural aspects, hyperglycemia, aging and GFR, ARF, CRF.

Sweat: production and hormonal control, regulation by ANS, hypothalamic control, composition, importance in body temperature regulation, heat loss, temperature increase and temperature decrease [vasoconstriction and piloerection] mechanisms, fever, interleukin-1, set point for temperature control, motor center for shivering

Module 11. - 20 Hours

Pancha Jnanendriyas

పంచా జ్ఞానంద్రియాల పేర్లు, వాటి సీట్లు, వాటి పనితీరు, వాటిని నియంత్రించే మేధానా అంశాలు, వాటిని నియంత్రించే మేధానా అంశాలు.

(Description of pancha Jnanendriyas, their seats. Functional aspects of memory, olfaction etc. and rapport with central areas in brain controlling each sensory area.)

Relevant Physiological aspects & Concerned applied aspects.

Eye: Refractive index, Refraction principle, convex/concave lens, focal length, accommodation, presbiopia, diameter of pupil, visual acuity, foveal region of retina, depth perception, vitreous and aqueous humors, IOP, structural elements of retina, 10 layers, rods and cons, Rhodopsin - retinal cycle, Rod photo reception, hyperpolarisation and rod membrane potential, photochemistry, color vision and 3 color mechanism, adaptation to light or dark, neural circuits with 6 types of cells, neurotransmitters such as glutamate, GABA, glycine, dopamine, acetyl choline, indolamines; electronic conduction, lateral inhibition, contrast, amacrine and bipolar cells, ganglion cells – w, x & y types, visual pathway from retina to dorsal lateral geniculate nucleus, & to primary and secondary visual cortex, processing, neuronal activity in occipital cortex during analysis of visual image, control of eye movements, [fixation, saccadic and pursuit movements].

Ear: Cochlear aspects - Physiology of hearing, transmission of sound waves, vibration of basilar membrane, Hair cell receptor potential, stereo cilia -Kino cilium -potassium channels-polarization & depolarization -endolymph -perilymph -stria vascularis - endocochlear electric potential, sound localization role, 'place' principle, loudness, central auditory pathways, - medial geniculate nucleus, transverse temporal gyrus of Herschel, sound frequency, frequencies audible to humans, primary auditory cortex, receptive aphasia, centrifugal projection in auditory system, nerve deafness, audiometer.

Vestibular functions – semicircular canals, utricle, saccule, macula, stratoconia, representation of 3 planes in space, ampulla, crista ampullaris, linear / angular acceleration, static equilibrium, cupula deflection, vestibular reflex actions, central connections – reticular formation, medial longitudinal fasciculus, vestibulospinal tracts, thalamus, cerebral cortex, cerebellar projections – cerebellar flacculonodular node.

Nose: Mechanism of olfaction, olfactory epithelium -receptors-sustentacular cells olfactory rods – pigment and contents, olfactory pathway -cribriform plate-dendrites of mitral cells-tufted cells-glomerular synapses-lateral olfactory stria-ipsilateral olfactory cortex-intermediate olf. Stria- olf. Tubercle- limbic system - medial olfactory stria- Olf. Cortex - piriform cortex – limbic system and olf. Discrimination, conscious perception, amygdala and emotional responses to olf. Stimuli, entorhinal cortex - olf.

Memories, odor, OBP, Camp mechanism, Na⁺ channels, distinguishing ability to 2000 to 4000 odors, adaptation to smell- olf. Fatigue and its selectivity, anosmia, parosmia, olf. Pathway is different and has no thalamic relays.

Tongue: Mechanism of taste perception, taste buds, fungiform, vallate and filiform papillae, basal/sustentacular/gustatory cells, tight junctions, pathway for taste – first, second and third order neurons, cranial nerve supplies to ant. 2/3rd and post. 1/3rd. NTS, thalamus, sensory cortex, 4 basic taste modalities – sweet, sour, bitter, salt. Electro physiology of taste, generator potential, acids – releasing H⁺ and blocking K⁺ channels, salts – Na⁺ ungated channels, sweets through cyclic AMP mechanism, bitter – phospholipase-C to trigger Ca²⁺, Ebner's glands, taste blindness, miracle fruit, taste adaptation mechanism, ageusia, hypogeusia, dysgeusia.

Skin: Sensory receptors, physiochemical stimulus into nerve impulse, threshold phenomena, stimulus intensity, adaptation, pain receptors, baroreceptors, chemoreceptors, thermoreceptor, proprioceptor, mechanoreceptor, nociceptor, neuronal pools- divergence, convergence and amplification, excitatory and inhibitory signals, reverberating and oscillating circuits, synaptic fatigue. Free nerve endings- Meissner's corpuscle, Merkel's discs, hair end organs, Ruffini's end organs, Pacinian corpuscles, somatosensory pathways in CNS, dorsal column – medial lemniscal system, primary end association somatosensory areas, anterolateral system, fast and slow pain, two pain pathways, internal pain suppression system, periaqueductal gray area, pain inhibition by tactile stimulus, electrical stimulation and pain relief, referred pain, hyperalgesia, thalamic pain syndrome, trigeminal neuralgia, head ache, migraine.

Module 12 - 15 Hours

Thanthra sareera

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(Description of ANS and CNS. Description of various sensory and motor pathways and centers. Narration of ida, Pingala, Sushumna and Shatchakras.)

Relevant Physiological aspects & Concerned applied aspects

CENTRAL NERVOUS SYSTEM: Receptors and reflexes, posture regulating systems and principal postural reflexes, pyramidal & extra pyramidal tracts and spinal cord, basal ganglia, cerebellum, thalamus, hypothalamus, ANS, Adrenal medulla, reticular activating system, CSF – Functions, production, circulation and fate of CSF, blood brain barrier.

PHYSIOLOGY OF NERVE CELLS: Neuron – types, excitability, stimulus, action, potential, myelin, zones of neurons, Neuronal degeneration – types – Wallerian, Retrograde, Transneuronal; Largest neuron, Nissl granules, CRO, latent period, firing level, spike potential, after-depolarization/hyperpolarisation, NGF, Glial cells, local anesthetic action, local circuit theory, accommodation.

Module 13. 15 Hours

Manas

Manas is the seat of intellect, perception, memory, and consciousness. It is the central organ of the mind, which receives and processes information from the senses and directs the activities of the body. Manas is also the source of emotions, desires, and volitions. It is the link between the body and the soul. Manas is the seat of the ego, which is the sense of individuality. It is the source of the mind's activities, which are the basis of all human actions. Manas is the seat of the intellect, which is the faculty of reasoning and judgment. It is the source of the mind's knowledge, which is the basis of all human wisdom. Manas is the seat of the memory, which is the faculty of storing and retrieving information. It is the source of the mind's experiences, which are the basis of all human learning. Manas is the seat of the consciousness, which is the awareness of one's own existence and the existence of others. It is the source of the mind's perception, which is the basis of all human experience. Manas is the seat of the emotions, which are the feelings and moods that influence human behavior. It is the source of the mind's desires, which are the wishes and aspirations that drive human action. Manas is the seat of the volitions, which are the decisions and intentions that guide human behavior. It is the source of the mind's actions, which are the basis of all human activity. Manas is the seat of the soul, which is the immortal essence of human beings. It is the source of the mind's spiritual experiences, which are the basis of all human enlightenment. Manas is the seat of the intellect, which is the faculty of reasoning and judgment. It is the source of the mind's knowledge, which is the basis of all human wisdom. Manas is the seat of the memory, which is the faculty of storing and retrieving information. It is the source of the mind's experiences, which are the basis of all human learning. Manas is the seat of the consciousness, which is the awareness of one's own existence and the existence of others. It is the source of the mind's perception, which is the basis of all human experience. Manas is the seat of the emotions, which are the feelings and moods that influence human behavior. It is the source of the mind's desires, which are the wishes and aspirations that drive human action. Manas is the seat of the volitions, which are the decisions and intentions that guide human behavior. It is the source of the mind's actions, which are the basis of all human activity. Manas is the seat of the soul, which is the immortal essence of human beings. It is the source of the mind's spiritual experiences, which are the basis of all human enlightenment.

(Manas and its various aspects. Properties such as anuthwa, ekatwa, jnanakannendriyatwa, site. Narration of sensory tracts, description of thought etc, Functions of manas such as imagination, inhibition of special senses, atma and its role in the functions of manas, its properties, experience of happiness and sorrow, knowledge and its origin, relation and unison of atma, manas, indriyas and indriya vishayas, the absence of it, ignorance, Origin of sleep, of dreams, mano vaha srothas, narration of manasika doshas, transfer a knowledge from indriyas. Wisdom of prana. Base of prana. Bala attributed by prana. Desire fulfillment of sadhaka pitha,

based at hrudaya. The capability of influencing indriyas by udana and vyana vathas. Proximity of budhy. Knowledge of sara and asara. Relationship of manasika doshas and sareerika doshas. Their supremacy. Versatility of manas in the context of versatility of purusha. Physiological knowledge of psychology and differentiation of knowledge principles.)

Relevant Physiological aspects & Concerned applied aspects

Brain functions: Cerebral cortex, intellectual functions, learning and memory – short / intermediate and long term memory, consolidation of memory, functions of specific cortical areas, association areas, higher intellectual functions, communication, language – input and output, transfer of information, thoughts, consciousness, behavioral and motivational mechanisms neurohormonal control, limbic system. Sleep-types, stages, EEG . Physiology of thalamus, various nuclei, UMN, LMN, pyramidal and extra pyramidal pathways, corticospinal pathway, functions of cerebellum, basal ganglia, vestibular apparatus, reticular formation, posture, reflexes, Brodmann's area, hypothalamus etc.

Module 14. - 18 Hours

Grandhy Samsthana

Grandhy Samsthana: Definition, sites, description of different ductless glands, the functional activity of their secretions, their effect on body and mind, symptomatology of hyper / hyposecretions.)

(Grandhy: sites, description of different ductless glands, the functional activity of their secretions, their effect on body and mind, symptomatology of hyper / hyposecretions.)

Relevant Physiological aspects & concerned applied aspects

Endocrinology: Definition of hormone, endocrine glands, chemical nature of function, parahormones, regulation of secretion by hypothalamus, hypothalamo-hypophyseal portal system, releasing and inhibiting hormones, feed back mechanisms, pituitary hormones – anterior and posterior, growth hormone, thyroid, adrenal cortex and medulla, mineralocorticoids, rennin-angiotensin, sex steroids, endocrine pancreas, glucagons, pineal gland, local hormones, parathyroid – Calcitonin – Vit.D, ant.pituitary,

post.pituitary, Endocrine functions of kidney, heart and pineal gland, local hormones including prostaglandins.

Total 22 Modules for Theory Total 210 Theory Hours

Syllabus for Practicals

1. General familiarity with Dhathoos, Upadhatoos and Malas in Physiological state.
2. Familiarity with Prakruthy like vatha and observation.
3. Objective evaluation of normal function of doshas, dhathoos and malas in healthy subjects and its absence in the diseased.
4. General knowledge about microscope, its use and detailed knowledge about body tissues.
5. Examination of urine
6. Examination of Blood - Hemoglobin, white blood cells count, etc.
7. Exposure to instruments commonly used in physiology like haemoglobinometer, haemocytometer, sphygmomanometer, sphgmograph, etc. with their practical use, prothrombin time, clotting time, bleeding time
8. Experimental physiology – Demonstrations of muscle nerve preparation, muscle twitch etc., use of Kymograph and other tests pertaining nervous system.

Marks for Practical & Oral Examinations - 200

Text Books Recommended

Prescribed Texts for Theory:

1. Ashtanga Samgraha
2. Ashtanga Hridaya
3. Sushrutha Samhitha
4. Charaka Samhitha
5. Text book of medical Physiology: Arthur C. Guyton

6. Principles of Anatomy & Physiology: Gerard J Tortora et.al
7. Human Physiology: Chatterjee
8. Concise medical Physiology: S.K.Chowdhuri
9. Review of medical Physiology: W.F.Ganong
10. Books in Kriyasareera by authors in local languages and in Hindi can also be included.

Reference books:

Best & Taylor's Physiological basis of Medical Practice

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Texts for Practicals:

1. A text book of practical physiology - Ghai
2. Medical Laboratory Technology Methods & Interpretations – Ramnik Sood

Practicals total hours 90, practical classes 72 hours, innovative session 18 hours

Details of practical to be conducted (72 hours)

1. Use and care of the microscope

2. PCV, ESR, Osmotic fragility
3. Hemoglobin estimation
4. R.B.C Count
5. W.B.C. Count – total and differential
6. Blood groups, tests of haemostatic function (Bleeding time, Clotting time etc.)
7. Blood Biochemistry – Blood Sugar, Blood Urea, S.Creatinine, Proteins, Lipid profile, S.Bilirubin
8. Cardio vascular system –Heart sounds, Recording of BP (effects of posture and exercise), Recording of arterial pulse, ECG.
9. Recording of body temperature
10. Respiratory system – spirometry for vital capacity.
11. Nervous system - Higher functions, sensory system, Motor system, reflexes, Examination of Cranial nerves.
12. Urine – Physical, Chemical (including pH), and microscopic examinations.
13. Assessment of Prakruthy, Saram.
14. Tumor markers
15. Immunoglobulins, CRP, Elisa for HIV, RA factor, ANA and such other autoimmune tests.
16. Hormonal assay of important hormones.
17. Pregnancy test.

INNOVATIVE SESSION (This includes project works, Seminars / assignment, structured discussion, integrated teaching, evaluation / revision): (Under practicals – 2 x 9 modules = 18 hours)

Broad modules include

1. Blood
2. Cardiovascular system
3. Respiratory system

4. Nervous system
5. Special senses
6. Digestive system
7. Endocrinology
8. Reproductive system
9. Renal system

Annexure - 2

(9&10) RECORD OF PRACTICALS

1. Study of Microscope
2. Blood – Microscopic examination – Hypotonic- Hypertonic-Isotonic
3. Hemoglobin
4. Grouping
5. Bleeding time
6. Clotting Time
7. Packed Cell Volume
8. Total RBC
9. Total WBC
10. Differential WBC Count
11. ESR
12. Mean Corpuscular Volume.
13. Biochemistry (Demonstration) + (Record)
 - a. Sugar
 - b. Lipid profile
 - c. Triglycerides
 - d. Proteins, A.G. Ratio.
14. Relevant Ayurvedic portion (Chart attached)– Estimation of

- a. Prakruthy
 - b. Sara
 - c. Dosha
 - d. Dhathu
 - e. Malas
15. Examination of body temperature
16. Examination of Respiratory system:
- a. General examination
 - b. Spirometry
 - c. Peak Flow Meter
17. Examination of Cardio vascular system:
- a. General examination
 - b. Pulse, Peripheral pulse spotting
 - c. Blood Pressure Measurement
 - d. Surface anatomy of auscultatory areas & Heart sounds
 - e. ECG. (Demonstration)
18. Examination of Nervous system:
- a. General examination
 - b. Deep tendon reflexes
 - c. Superficial reflexes
 - d. Testing of sensation
 - e. Examination of cranial nerves including fundus examination by ophthalmoscopy and use of tuning fork (Demonstration).
19. Examination of urinary system
- a. General examination
 - b. Urine examination:
 1. Physical (Specific gravity and color)

2. Chemical (pH, sugar, albumin, Ketone bodies, Bile salts, Bile pigments, Occult blood.)
 3. Microscopic (Pus cells, RBC, Oxalates, epithelial cells)
20. Study of equipments and components, Kymograph, Centrifuge apparatus, Distillation unit, Catheter (No diagram necessary, only brief data)
 21. Study of normal values (Chart attached).


Annexure 3

Model Question Bank

MCO

1. Match the immunoglobulin in each question with the lettered characteristics that are most closely associated with it. Each lettered characteristic may be selected once more than once, or not at all.
 - A. Complement fixation
 - B. Secretory immunity
 - C. Release of histamine from Basophils and mast cells
 - D. Tetramer
 - E. Antigen, recognition by B cells

(1)IgA (2) Ig D (3) Ig E (4) Ig G (5) Ig M.
2. Which of the following is not primarily a function of blood plasma?
 - A. Transport of hormones
 - B. Maintenance of red cell size
 - C. Transport of chylo microns
 - D. Transport of antibodies
 - E. Transport of O₂
3. A hematocrit of 41% means that in the sample of blood analyzed.

- A. 41% of the hemoglobin is in the plasma
 - B. 41% of the total blood volume is made up of blood plasma
 - C. 41% of the total blood volume is made up of red and white blood cells and platelets.
 - D. 41% of the hemoglobin is in red blood cells
 - E. 41% of the formed elements in blood are red blood cells.
4. In normal human blood
- A. The eosinophil is the common type of white blood cell
 - B. There are more lymphocytes than Neutrophils
 - C. The iron is mostly in hemoglobin
 - D. There are more white cells than red cells
 - E. There are more platelets than red cells.
5. In which of the following plasma proteins is not synthesized in the liver?
- A. Angiotensinogen
 - B. IGF-1
 - C. Angiotensin –converting enzyme
 - D. a 2 macroglobulin
 - E. Fibrinogen
6. Lymphocytes
- A. All originate from the bone marrow
 - B. Are unaffected by hormone
 - C. Converted to Monocytes in response to antigen
 - D. Interact with eosinophil to produce platelets
 - E. Are part of the body's defense against cancer
7. Refer to figure 

1. Which of the labels identifies the part of the ECG that corresponds to ventricular repolarization?
 2. Which of the labels identifies the Q wave?
 3. Which of the labels identifies the part of the ECG that corresponds to maximum opening of ventricular Na^+ channels?
 4. Which of the labels identifies the part of the ECG that corresponds to maximum opening of ventricular Ca^{2+} channels?
8. In second degree heart block
- A. The ventricular rate is lower than the atrial rate
 - B. The ventricular ECG complexes are distorted
 - C. There is a high incidence of ventricular tachycardia.
 - D. Stroke volume is decreased
 - E. Cardiac output is increased.
8. Carotid sinus massage sometimes stops supraventricular tachycardia because
- A. It decreases sympathetic discharge to S.A. node
 - B. It increases sympathetic discharge to S.A. node
 - C. It increases vagal discharge to the conducting tissue between atria and the ventricles
 - D. It decreases sympathetic discharge to the conducting tissue between atria and ventricle
 - E. It increases the refractory period of the ventricular myocardium.
9. Currents caused by opening of which of the following channels contribute to the repolarization phase of the action potential of ventricular muscle fibers?
- A. Na^+ channel
 - B. Cl^- channel

- C. Ca^{2+} channel
 - D. K^+ channel
 - E. HCO_3^- channel
10. In complete heart block
- A. Fainting may occur because the atria are unable to pump blood into the ventricles
 - B. Ventricular fibrillation is common
 - C. The atrial rate is lower than the ventricular rate
 - D. Fainting may occur because of prolonged periods during which the ventricles fail to contract.
11. The second heart sound is caused by
- A. Closure of the aortic and pulmonary valve
 - B. Vibrations in the ventricular wall during systole
 - C. Ventricular filling
 - D. Closure of the mitral and tricuspid valve
 - E. Retrograde flow in the venacava
12. The work performed by the left ventricle is substantially greater than that performed by the right ventricle because in the left ventricle,
- A. The contraction is slower
 - B. The wall is thicker
 - C. The stroke volume is greater
 - D. The preload is greater
 - E. The after load is greater
13. Lymph flow from the foot is
- A. Increased when an individual rises from the supine to the standing position.
 - B. Increased by massaging the foot.

- C. Increased when capillary permeability is decreased
 - D. Decreased when the valves of leg veins are incompetent
 - E. Decreased by exercise
14. When the radius of resistance of vessels is increased which of the following is increased?
- A. Systolic blood pressure
 - B. Diastolic blood pressure
 - C. Viscosity of the blood
 - D. Hematocrit
 - E. Capillary blood flow
15. Most of the CO₂ transported in the blood is dissolved in plasma
- A. In carbamino compounds formed from plasma protein
 - B. In carbamino compounds formed from hemoglobin
 - C. Bound to Cl
 - D. In HCO₃⁻
16. Which of the following has the greatest effect on the ability of blood to transport oxygen?
- A. Capacity of the blood to dissolve oxygen
 - B. Amount of hemoglobin in the blood
 - C. pH of plasma
 - D. CO₂ content of red blood cells
 - E. Temperature of blood
17. Which of the following has the greatest buffering capacity in the interstitial fluid
- A. Hemoglobin system
 - B. Bicarbonate system
 - C. Phosphate system

- D. Proteins in the interstitial fluid
 - E. Ammonium - ammonia system
18. Which of the following discharge spontaneously during quiet breathing?
- A. Inspiratory neurons
 - B. Motor neurons to respiratory muscles
 - C. Neurons in the Apneustic center
 - D. Expiratory neurons
 - E. Stretch receptors in the lungs
19. Intravenous lactic acid increases ventilation. The receptors responsible for this effect are located in the
- A. Medulla oblongata
 - B. Carotid bodies
 - C. Lung parenchyma
 - D. Aortic baro-receptors
 - E. Trachea and large bronchi
20. Spontaneous respiration ceases after
- A. Transection of the brain stem above pons
 - B. Transection of brain stem at the caudal end of the medulla
 - C. Bilaterally vagotomy
 - D. Bilateral vagotomy combined with transection of the brain stem at the superior border of pons.
 - E. Transection of the spinal cord at the level of the first thoracic segment.
21. When the viscosity of the blood is increased which of the following is increased
- A. Mean blood pressure
 - B. Radius of the resistance vessels
 - C. Radius of the capacitance vessels

- D. Central venous pressure
 - E. Capillary blood flow
22. On the summit of Mt. Everest, where the barometric pressure is about 2.5 mm Hg., the partial pressure of O₂ is about
- A. 0.1 mm Hg
 - B. 0.5 mm Hg
 - C. 5 mm Hg
 - D. 50 mm Hg
 - E. 100 mm Hg
23. The approximate amount of gas left on the lungs after minimal forced expiration in a normal man is
- A. Zero
 - B. 0.1 L
 - C. 1.1 L
 - D. 3.1 L
 - E. 4.2 L
24. The tidal volume in a normal man at rest is about
- A. 0.5 L
 - B. 1.2 L
 - C. 2.5 L
 - D. 4.9 L
 - E. 6.0 L
25. What is the approximate dead space of a normal 70 kg man breathing through a tube that has a radius of 5 mm and a length of 100 cm?
- A. 150 ML
 - B. 180 ML
 - C. 230 ML

- D. 280 ML
 - E. 250 ML
26. Which of the following is responsible for the movement of O₂ from the alveoli into blood in the pulmonary capillaries?
- A. Active transport
 - B. Filtration
 - C. Secondary active transport
 - D. Facilitation diffusion
 - E. Passive diffusion

Multiple-choice questions – CONT.

1. All membranes
 - A. Consist almost entirely of protein molecule
 - B. Are impermeable to fat-soluble substances.
 - C. Some tissues permit the transport of glucose at a greater rate in the presence of insulin.
 - D. Are freely permeable to electrolytes but not to proteins.
 - E. Has a stable composition throughout the life of the cell.
2. The primary force moving water molecules from the blood plasma to the interstitial fluid is
 - A. Active transport
 - B. Co-transport with H⁺
 - C. Facilitated diffusion
 - D. Co-transport with Na⁺
 - E. Filtration
3. Second messengers
 - A. Are substances that interact with first messengers inside cells
 - B. Are substances that bind to first messengers on the cell membrane

- C. Are hormones secreted by cells in response to stimulation by another hormone.
 - D. Mediate the intracellular response to many hormones and neurotransmitters
 - E. Are not formed in the brain
4. The resting membrane potential of a cell
- A. Is dependent on the permeability of the cell membrane to K^+ being greater than the permeability to Na^+
 - B. Falls to zero immediately when $Na^+ - K^+$ ATP are in the membrane is inhibited
 - C. Is usually equal to the equilibrium potential for K^+
 - D. Is usually equal to the equilibrium potential for Na^+
 - E. Is markedly altered if the extra cellular Na^+ concentration is increased.
5. Proteins that are secreted by cells are generally
- A. Not synthesized on membrane – bound ribosome
 - B. Initially synthesized with a signal peptide or leader sequence at their terminal.
 - C. Found in vesicles and secretory granules
 - D. Moved across the cell membrane by endocytosis
 - E. Secreted in a form present that is larger than the form present in the endoplasmic reticulum
6. Osmosis is
- A. Movement of solvent across a semi permeable membrane from an area where the hydrostatic pressure is high to an area where the hydrostatic pressure is low.
 - B. Movement of solute across a semi permeable membrane from an area in which it is in low concentration to an area in which it is in high concentration.

- C. Movement of solute across a semi-permeable membrane from an area in which it is in high concentration to an area in which it is in low concentration.
 - D. Movement of solvent across a semi-permeable membrane from an area in which it is in low concentration to an area in which it is in high concentration.
 - E. Movement of solvent across semi-permeable membrane from an area in which it is in high concentration to an area in which it is in low concentration.
7. Deuterium oxide and insulin are injected into a normal 30-year-old man. The volume of distribution of deuterium oxide is found to be 42 L and that of insulin is 14 L.
- A. The man's intracellular fluid volume is about 14 L
 - B. The man's intracellular fluid volume is about 28 L
 - C. The man's plasma volume is about 7 L
 - D. The man's interstitial fluid volume is about 9 L
 - E. The man's total body weight cannot be calculated from these data
8. Which of the following decreases due to a mutation in the mitochondrial genome?
- A. Cystic fibrosis
 - B. Leber's hereditary optic neuropathy
 - C. Nephrogenic diabetes insipidus
 - D. Familial male precocious puberty
 - E. Hirschsprung's disease
9. Which of the following receptors does not span the cell membrane 7 times?
- A. β – Adrenergic receptor
 - B. Rhodopsin

- C. $5 - \text{HT}_{\text{IC}}$ receptor
 - D. Mineralocorticoid receptor
 - E. LH receptor
10. Which of the following does not act intracellular to produce physiologic effects?
- A. Triiodothyronine
 - B. Inositol triphosphate
 - C. Aldosterone
 - D. Cyclic AMP
 - E. Dopamine

In questions 11-14, match the disease in each question with the lettered item that is most closely associated with it. Each lettered item may be selected once, more than once or not at all

- A. Abnormal receptor for catecholamine
 - B. Abnormal G protein
 - C. Antibodies against receptor
 - D. Deficiency of receptors for extra cellular protein
 - E. Abnormal receptor for extra cellular protein
- a. Many cases of Grave's disease
 - b. Some cases of pseudohypoparathyroidism
 - c. Some cases of familial hypercholesterolemia
 - d. Some cases of acromegaly
1. The diffusion co-efficient of O_2 as compared with that of CO_2 is
- A. Greater because O_2 combines with hemoglobin
 - B. Less because O_2 is less soluble
 - C. Greater because of a higher pressure gradient
 - D. Less because of the lower molecular weight of O_2

- E. Essentially the same
2. Airway resistance can be reduced by
- A. Increasing vagal impulses to the lungs
 - B. Administering a β adrenergic blocking drug
 - C. Decreasing the radial traction exerted by lung tissue
 - D. Performing a maximal forced expiration
 - E. Increasing lung volume
3. A reduction of arterial O_2 tension is typical of :
- A. Anemia
 - B. CO poisoning
 - C. Moderate exercise
 - D. Cyanide poisoning
 - E. Hypoventilation
4. Which one of the following statements regarding the compliance of the respiratory system is true
- A. It is greater than the compliance of the chest wall.
 - B. It is greater than the compliance of the lung
 - C. It is equal to the compliance of the chest wall
 - D. It is equal to the compliance of lung
 - E. It is less than the compliance of the chest wall
5. During the effort - independent portion of a forced vital capacity (F.V.C) maneuver, the expiratory flow rate
- A. Varies as a function of the interpleural pressure
 - B. Is limited by compression of the airways.
 - C. Depends on the alveolar pressure
 - D. Is maximal for that individual
 - E. Is constant

6. Maximal inspiratory gas flow occurs when the
 - A. Lung volume approaches total lung capacity (TLC)
 - B. Lung volume approaches residual volume (RV)
 - C. Alveolar pressure is most negative
 - D. Inter-pleural pressure is approximately $-5 \text{ cm H}_2\text{O}$
 - E. Abdominal muscles are manually contracted.
7. A lack of normal surfactant as occurs in infants with respiratory distress syndrome (RDS) results in
 - A. An increased lung compliance
 - B. Stabilization of alveolar volume
 - C. An increased refractive force of the lung
 - D. A reduced alveolar arterial O_2 tension difference
 - E. A decrease in the filtration forces in the pulmonary capillaries
8. During inspiration, as the diaphragm contracts, the pressure in the interpleural space becomes
 - A. Equal to zero
 - B. More positive
 - C. More negative
 - D. Equal to the pressure in alveoli
 - E. Equal to the pressure in atmosphere
9. The volume of gas in the lungs at the end normal expiration is referred to as the
 - A. Residual volume (RV)
 - B. Expiratory reserve volume (ERV)
 - C. Functional residual capacity (FRC)
 - D. Inspiratory reserve volume (IRV)
 - E. Total lung capacity (TLC)

10. The major area of airway resistance during breathing is located in the
 - A. Oropharynx
 - B. Trachea and large bronchi
 - C. Intermediate sized bronchi
 - D. Bronchioles less than 2 mm in diameter
 - E. Alveoli
11. A patient with restrictive lung disease typically has
 - A. An increased Forced Expiratory Volume (FEV_1) and normal lung compliance
 - B. A decreased FEV_1 and increased lung compliance
 - C. A decreased FEV_1 and decreased lung compliance

Answer the following in one word or in one sentence

1. The number of chromosomes in somatic cells of human being.
2. Which of these is more in intracellular fluid - Na or K.
3. Name the various artificial stimuli of nerve fibers.
4. Which is the best form of artificial stimulus for nerve fibres?
5. What is the thermal range for nerve fibres activity?
6. What is the average nerve impulse velocity rate in frog's nerve and human nerve?
7. What is the association of thickness of nerve fibres to the velocity rate?
8.
 - a. The normal RBC count
 - b. Site of production of haem portion of Hb
 - c. Diameter of RBC and principal cation of RBC.
 - d. No. of Fe atoms in each Hb molecule
 - e. Average daily production of Hb in body
 - f. Normal mean corpuscular Hb concentration (M.C.H.C.)

- g. Shape of RBC in human blood.
 - h. Normal mean Corpuscular Volume (M.C.V.)
 - i. Normal colour index and life span of RBC
 - j. Normal Hb and normal reticulocyte count
 - k. Form in which Fe is stored in reticulo-endothelial cells.
 - l. Normal average ratio in no. of WBC and RBC in human body.
 - m. Normal total leukocyte count and average period for normal development of Neutrophils.
 - n. Normal platelet count & their life span.
 - o. Bone marrow concerned with Haemopoiesis.
 - p. Most common site for bone marrow biopsy.
 - q. Specific gravity of blood, serum and corpuscles.
 - r. Site of formation of prothrombin and fibrinogen.
 - s. Normal total osmotic pressure exerted by plasma proteins.
 - t. Normal range of total plasma proteins.
 - u. Molecular weight of albumin, fibrinogen
 - v. Average daily amount of formation of plasma proteins.
 - w. Normal clotting, bleeding and clot retraction time.
 - x. Normal total blood volume and pH of blood.
 - y. Relative volume of plasma and corpuscles.
 - z. Coagulation factor lacking in haemophilia.
9. What is the importance of MN blood group? Short answer.
10. Name the important blood groups and how are they classified under 'ABO' type?
11. Name some common anticoagulants used in collection of blood for laboratory tests.
12. Conditions under which blood viscosity rises and the defects of

- blood coagulation. Describe about the above 2 points.
13. Name the main buffer systems in the body that help maintain the body pH.
 14. Define acidaemia and alkalaemia.
 15. Define leucopenia, trephines.
 16. Which is the main source of plasma proteins? Name their various types.
 17. What is the usefulness of ESR? Does it increase in both rheumatoid arthritis and osteoarthritis? Short answer.
 18. Answer in one word.
 - a. Main extracellular fluid cation
 - b. Main anions in ECF
 - c. Main ICF cation
 - d. pH of ECF
 - e. Normal average capillary pressure at venous end.
 - f. Normal average capillary pressure at arterial end.
 - g. Rate of lymph flow
 - h. Discoverer of blood circulation & S.A. node
 - i. Other names of left A.V. valve and right A.V. valve.
 - j. Pacemaker of heart
 - k. Intrinsic heart rate
 - l. Normal heart rate
 - m. First, who measured blood pressure?
 - n. Discoverer of sphygmomanometer
 - o. Normal pulmonary blood flow rate, blood flow rate in liver.
 - p. Time for coronary circulation
 - q. Normal coronary blood flow

19. Define tachycardia, bradycardia, pulses alternans, elasticity of blood vessel.
20. What is the normal duration of cardiac cycle? Mention the time relation of auricle and ventricle in cardiac cycle separately.
21. What is the effect of vagus nerve on heart beat? How are the volume changes in heart recorded?
22. What is Fick's principle?
23. Name the following
 - a. The normal respiratory rate
 - b. Composition of alveolar and expired air
 - c. Respiratory quotient
 - d. Total pressure of alveolar air
 - e. Intrapulmonary pressure during inspiration and expiration in forced breathing & ordinary breathing.
 - f. Intrathoracic pressure during inspiration and expiration.
 - g. O_2 saturation in the blood below which signs of O_2 deficiency develop.
24. What is ventilation perfusion ratio? What is the diffusing capacity of alveolar membrane?
25. When is intrapulmonary pressure equal to atmospheric pressure?
What is the partial pressure of various gases in alveolar air?
26. What is the effect of acidaemia on O_2 dissociation curve? How does variation in CO_2 affect O_2 dissociation curve?
27. What are the effects of CO_2 addition to blood? In which form is the venous CO_2 mostly found?
28. Of the O_2 , CO_2 tension and H^+ ion concentration; which is the most potent factor for respiratory centre stimulation?
29. What are the chemical factors that lead to stimulation of respiratory centre? Which of the two inspiratory and expiratory centres are

dominant in action if both are equally and simultaneously stimulated?

30. Define :

- | | |
|-------------------------------|-----------------|
| a. Eupnoea | b. Tachypnoea |
| c. Bradypnoea | d. Hypercapnoea |
| e. Hypocapnoea | f. Hyperpnoea |
| g. Dyspnoea | h. Apnea |
| i. Maximal ventilation volume | |
| j. Anoxaemia | k. Anoxia. |

Essay Questions

1. Give a brief note on different purushas explained by Charakacharya. Justify the importance of Shad dhathu purusha in Ayurvedic view.
2. Describe vayu Swaroopasthanas and their functions in detail.
3. Describe the relation between Udana vayu and Vyana vayu in control of cardiac functions with the help of current principles of physiology.
4. Explain the functions of Hridaya with the help of neat diagram.
5. Define shareera and explain the role of Panchamahabhoothas in the formation of shareera.
6. Define Prakrithi. Write the type and lakshanas of Kapha prakrithi.
7. Write the Nirukti, Guna, Karma, Bhedas and Vridhi – lakshanas of Pitta dosha.
8. Write 'Rasa Uthpathi' in detail.
9. Explain Raktha and the function in detail
10. Explain the Pancha Bhoothakatwa of Shareera
11. Write the Guna, karma, Sthana, Vridhi and Kshaya lakshanas of Pitta.
12. Explain the rasa ranjna kriya
13. What are the Sadharmya and Vaidharmya of Prakrithi and Purusha? Explain.

14. Explain 'trigunatmakatwa of Sareera.
15. Define Prakrithi. Which are the pre- conceptional, post- conceptional, hereditary and physical factors influencing the formation of prakrithi? What is upataptha beeja?
16. Describe the physical and mental attributes of Vatha prakrithi.
17. Describe the physical and mental attributes of Pitta prakrithi
18. Describe the physical and mental attributes of Kapha prakrithi
19. Discuss the functional importance of 'Malas'
20. Discuss the functional importance of Upadhathus.
21. Discuss the functional importance of Saptha dhathus.
22. Can we correlate the functions attributed to Vata with the functions of Nervous System?
23. Correlate the functions attributed to Pitta with modern physiology.
24. Establish that Vata, Pitta and Kapha represent a group of multitudinous events which take place in the living body, under 3 broad headings.
25. Discuss the concept of purusha in various aspects - philosophical, meta physical and physiological aspects.

Short Notes (Ayurvedic Portions)

1. Give a brief note on different purushas explained by Charakacharya. Justify the importance of shad dhathu purusha in Ayurvedic view.
2. Define Kriyakala. Give a clear picture of Doshas and Dooshyas in Sthanasamsrayavastha.
3. Write about Swasapraswasa kriya.
4. Describe Vayu Swaroopasthanas and its function.
5. Describe the relation between Udana vayu and Vyana vayu in control of cardiac functions with the help of current principles of physiology
6. Write short note on Pitta bhedas.
7. Describe Sareera Vridhikara bhavas.

8. Define Purusha and describe Loka purusha samya.
9. Explain Dehaprakrithi. Write in detail about trividha deha prakrithi.
10. Write short note on Udana Vayu.
11. Define Prakrithi. What are the types of prakrithi? Which are the factors affecting the formation of prakrithi?
12. What are the causes of Srodhorodha
13. Mention the causes of Asthi Vaha Srothodushti
14. Narrate the upadhathus and describe Sthanya
15. Write the Ekadasha indriyas and their karmas
16. Define Prakrithi. Write the types of Prakrithi and the lakshanas of Kapha prakrithi.
17. What are the shatkriyakalas? Name them and describe sthana Samshraya and Vyaktha avasthas.
18. Name the Doshas present in the Hridaya and write the role of Hridaya in Rasa raktha paribhramana.
19. Write about Prana vaha Srothas and describe Shwasana padha.
20. Write short notes on formation of speech. (Vak-Utpathi)
21. Define Upadhathus? Describe its formation.
22. Explain the Sthana and function of Vyana vayu.
23. Describe the Sthana and dushti lakshana of Prana vaha Srothas.
24. What are the Sudha raktha lakshanas? What are the functions of raktha dhathu.
25. Write short note on Ambara Piyusha.
26. Write short note on Swasavarodham.
27. Explain Rasaranjana kriya.
28. Define Srothas, its classification and causes of Srothodushti?
29. Which are the Karma indriyas? Explain the action of vocal cord?
30. Write short note on Udana vayu?

31. What is the importance of Raktha dhathu
 32. Define Srothas. Types of Srothas and distinguish them.
 33. Define Upa-dhathu. Explain the formation and control of Sthanya.
1. Which among the following is not a function of dhatus?
 - a. Prinanam
 - b. Lepanam
 - c. Poorana
 - d. Kledavahanam
 2. Which among the following dhatus do the function of Poorana?
 - a. Asthi
 - b. Majja
 - c. Rasa
 - d. Mamsa
 3. Which among the following is the function of rasa dhathu?
 - a. Prinanam
 - b. Jeevanam
 - c. Sneha
 - d. Dharanam
 4. Which among the following is the function of Pureesha?
 - a. Kledavahanam
 - b. Dharanam
 - c. Avashtambha
 - d. Lepanam
 5. 'Ushna kamitwa' is due to :
 - a. Vata kshaya
 - b. Kapha Vridhi
 - c. Vata Vridhi
 - d. Pitha Vridhi

6. Vata Vridhi causes:
 - a. Pralapa
 - b. Praseka
 - c. Alpa bhashyam
 - d. Alpa nidrata
7. Which among the following is not a symptom of Pitha Vridhi?
 - a. Kshuth
 - b. Trit
 - c. Ati nidrata
 - d. Alpanidratha
8. One of the following is symptom common for Slesmavridhi and Vata kshaya
 - a. Bala bhrama
 - b. Pralapa
 - c. Praseka
 - d. Kshuth
9. Yellow coloration of the faeces, urine, eyes and skin is due to
 - a. Vata Vridhi
 - b. Pitta Vridhi
 - c. Kapha Vridhi
 - d. Pitta kshaya
10. Dyspnoea is caused by
 - a. Vata Vridhi
 - b. Kapha Vridhi
 - c. Pitta Vridhi
 - d. Rakta Vridhi
11. Which dhathu when increased produce the same symptoms of

- increased kapha?
- Rakta
 - Rasa
 - Mamsa
 - Medas.
12. 'Visarpa' is caused by
- Increase in rasa dhathu
 - Decrease in rasa dhathu
 - Increase in raktha dhathu
 - Decrease in raktha dhathu
13. Among the following, one is not a symptom of Rakta Vridhi.
- Kushta
 - Agni nasha
 - Asra pitha
 - Sira shaidhilyam
14. Kamala or jaundice is caused by
- Rasa vridhi
 - Rasa kshaya
 - Rakta vridhi
 - Rakta kshaya
15. Enlargement of lymph glands and malignant tumor are symptoms of :
- Increase in rasa dhathu
 - Increase in rakta dhathu
 - Increase in mamsa dhathu
 - Increase in Sukla dhathu
16. Over-growth of bones and extra teeth is caused by

- a. Rakta vridhi
 - b. Rasa vridhi
 - c. Majja vridhi
 - d. Asthi vridhi
17. Meda vridhi causes
- a. Heaviness of eyes and body
 - b. Drooping of buttocks, breast and abdomen
 - c. Increase of size of body
 - d. Excess of hunger and thirst
18. 'Sukrasmari' is a symptom of
- a. Sukra vridhi
 - b. Sukra kshaya
 - c. Shakrit Vridhi
 - d. Shakrit kshaya
19. Vata kshaya results in
- a. Ushna kamitwa
 - b. Kampa
 - c. Karshyam
 - d. Alpa bhashanam
20. Decrease in hunger is due to
- a. Vata vridhi
 - b. Vata kshaya
 - c. Pitta vridhi
 - d. Pitta kshaya
21. One of the following is caused by Rasa dhatu kshaya
- a. Sabda asahishnutha
 - b. Visarpa

- c. Kamala
 - d. Sira shaidhilyam
22. Desire for sour and cold things is caused due to
- a. Increase in rasa dhatu
 - b. Increase in raktha dhatu
 - c. Decrease in rasa dhatu
 - d. Decrease in raktha dhatu
23. Tremors of heart is due to
- a. Slesma Kshaya
 - b. Slesma Vridhi
 - c. Pitta Kshaya
 - d. Pitta Vridhi
24. Looseness and pain in joints is symptom of
- a. Increase in Rasa
 - b. Increase in Asthi
 - c. Decrease in Majja
 - d. Decrease in Asthi
25. Which of the following is not caused by kshaya of majja?
- a. Asthi sourshiryam
 - b. Bhrama
 - c. Pain in joints
 - d. Timira darsanam
26. Urine mixed with blood is seen in
- a. Rakta Vridhi
 - b. Moothra Kshaya
 - c. Rakta Kshaya
 - d. Both a & b

27. Both Asthi Kshaya and Sweda kshaya results in
- Pain in joints
 - Hair falling
 - Cracking of skin
 - Hollowness of bone
28. From which of the following we can infer Mala kshaya?
- Dryness of Mala sthana
 - Pricking of pain in Mala sthana
 - Emptiness of Mala sthana
 - All the above
29. Increase of malas can be inferred by
- Non-elimination
 - Over elimination
 - Pain in Mala sthanas
 - None of the above
30. Decrease of malas can be inferred by
- Non elimination
 - Over elimination
 - Pain in Mala sthanas
 - None of the above
31. Which among the following is the most injurious?
- Mala Vridhi
 - Mala kshaya
 - Mala Sanga
 - Both a & b
32. Vayu resides in
- Sweda

- b. Rasa
 - c. Rakta
 - d. Asthi
33. Pitta resides in
- a. Sweda
 - b. Rakta
 - c. Rasa
 - d. Both a & b.
34. Slesma does not reside in
- a. Mamsa
 - b. Majja
 - c. Asthi
 - d. None of the above
35. Medicines/therapies does not function in the same way for asraya and asrayi in the case of
- a. Asthi and Vata
 - b. Rakta and Pitta
 - c. Sweda and Pitta
 - d. Mamsa and kapha
36. The disease arising from increase and decrease of vata should be treated quick by adopting
- a. Brimhana and Langhana respectively
 - b. Langhana and Brimhana respectively
 - c. Deepana oushadha and Pachana oushadha respectively
 - d. Anuvasanam and Snehapana respectively
37. Diseases caused by rakta vridhi can be treated by
- a. Virechana & raktamoksha

- b. Virechana & vasthi
 - c. Virechana & Vamana
 - d. None of the above
38. 'Kshara prayoga' is a treatment for
- a. Rakta vridhi
 - b. Mamsa vridhi
 - c. Medo vridhi
 - d. Asthi vridhi
39. Decrease of Asthi can be treated by
- a. Enema therapy using milk
 - b. Enema therapy using ghee
 - c. Vasthy using milk, ghee etc.
 - d. All the above
40. Abdominal viscera of goat is used as treatment in
- a. Vit Vridhi
 - b. Vit kshaya
 - c. Mutra Vridhi
 - d. Mutra kshaya
41. The first dhatu which gets formed from food after digestion
- a. Rakta
 - b. Rasa
 - c. Mamsa
 - d. Medas
42. The number of malayanas in head
- a. 5
 - b. 1
 - c. 7

- d. 3
43. Ojus is located in
- Shiras
 - Hridaya
 - Nabhi
 - Uras
44. Colour of Ojus
- Slight reddish-brown
 - Slight reddish-yellow
 - Silvery white
 - Skin colour
45. Which among the following is not the quality of Ojus?
- Snigdhatta
 - Somatmakata
 - Sudha
 - Tikshnata
46. Which of the following is not caused by Ojakshaya?
- Rookshatwam
 - Vyedhirendriyatwam
 - Kshama
 - Kopa
47. Causes of Ojakshaya
- Kopa
 - Kshuth
 - Soka
 - All the above

Drugs of Jeevaneeya gana is used in

- a. Rakta kshaya
 - b. Rasa kshaya
 - c. Oja kshaya
 - d. None of the above
49. One of the following is not a function of Vata
- a. Utsaha
 - b. Medha
 - c. Uchwasa
 - d. Vega pravartana
50. Sthiratwa and Snigdhatwa of body is due to
- a. Vata
 - b. Pitta
 - c. Kapha
 - d. Mamsa

Short answer questions

1. Define: a) Physiology b) Homeostasis c) Epithelium d) Tissue e) Chromatin f) Cell
2. What is a cell membrane and what are its main functions
3. What are the functions of the following
 - a) Mitochondria
 - b) Ribosome
 - c) Centriole
 - d) Golgi apparatus
 - e) Nucleus
 - f) Epithelia
4. What is the composition of a gene and DNA?

5. Give differences between meiotic and mitotic cell divisions and describe the various phases in mitotic cell division.
6. Name the different types of tissues, epithelia and connective tissue in our body.
7. What do you mean by internal environment of the body?
8. What is the Bell and Magendie law? How do they classify nerve fibres?
9. Define :
 - a. Nervous Impulse
 - b. Cathode and Anode stimulus
 - c. Electro tonus
 - d. Dr. Bois Regmond's Law
 - e. Action potential
 - f. Normal heat coefficient of nervous impulses
 - g. Ascending and descending current
10. What are the functions of medullary sheath of nerve fibres?
11. Define :
 - a. Blood
 - b. Haemolysis
 - c. Colour index
 - d. Packed cell volume
 - e. Leucocytosis
 - f. Polycythaemia
 - g. Jaundice
 - h. Anaemia
 - i. Leucopenia
 - j. Agranulocytosis

- k. Leukemia
 - l. Thrombocytopenia
 - m. Puerpera
 - n. ESR
 - o. Plasmaphoresis
 - p. Thrombosis
 - q. Fibrinolysis
 - r. Haemophilia
 - s. Chloride shift
 - t. Blood platelets
12. What are the functions of :
- a. Blood
 - b. RBC's
 - c. Hb
 - d. Leucocytes
 - e. Iron
 - f. Platelets
 - g. Bone marrow
 - h. Plasma proteins
13. Who discovered Rh factor, why is it named so? What are the various Rh agglutinogens in the system?
14. What are the indications for blood transfusion? What are the effects of incompatible blood transfusion ?
15. What are the main points to be taken into consideration while undertaking blood transfusion?
16. What is the mode of action of heparin? How does dicumarol act as anticoagulant?

17. Explain the process of blood coagulation. Why does blood not clot in blood vessels?
18. Name the factors regulating blood reaction. What are the main causes of hemorrhagic states in body?
19. What is the main site for formation of plasma proteins and which of them can pass through the capillary endothelium?
20. What are the various types of bone marrow? What are the common indications for bone marrow study?
21. How do you classify Puerpera?
22. Name some conditions in which leucopenia and Leucocytosis are present ?
23. Into how many types is jaundice differentiated?
24. Name the types of anaemia and which is the commonest of them? What is the etiology of pernicious anemia ?
25. Name the types of leucocytes and conditions under which Polycythaemia normally occurs?
26. What is tissue fluid, how is it removed and what are its main functions?
27. What is edema and what are its main types?
28. How is extracellular fluid classified? What are the factors on which fluid balance in the body depends?
29. What is the mode of formation of tissue fluid?
30. Name the various sites of R.E.S. in the body?
31. Define lymph and cite the main function of lymphatic system. Among lymph and tissue fluid which has more protein?
32. What are the functions of spleen?
33. What are the characteristics of the cardiac muscle structure, which enable its continuous rhythmic contractions?
34. Define:

- a. Ventricular fibrillation
- b. Auricular fibrillation
- c. Auricular flutter
- d. Incomplete heart block
- e. Complete heart block
- f. Idio-ventricular rhythm
- g. Arborization block
- h. Law of heart muscle
- i. Apex beat
- j. Cardiac output
- k. Dextrocardiogram
- l. Levo-cardiogram
- m. Vagal – escape
- n. Mary's law
- o. Blood pressure
- p. Systolic, diastolic pressure
- q. Pulse pressure
- r. Peripheral resistance
- s. Poiseuille's law
- t. Circulation time
- u. Velocity of blood
- v. Pulse
- w. Pulse paradoxus
- x. Water hammer pulse
- y. Hemorrhage
- z. Haemostasis

35. What are the murmurs? How do you classify them?
36. Mention various phases of ventricular systole and ventricular diastole along with their period.
37. Describe Ist and IInd heart sound along with their importance.
38. How is atrial hypertrophy indicated by P wave in ECG and what are common abnormalities of P wave?
39. What are the main factors on which cardiac output control depends?
40. What are the factors that control B.P., and those, which affect heart rate?
41. What is significance of T wave and T.P. interval
42. What are the factors on which B.P. depends?
43. What is the cause of vagal escape phenomenon?
44. What are the cardiac centres situated?
45. What is the difference between left and right cardiac failure on basis of presence of edema?
46. What are the features of left and right ventricular failure? What are the causes of left ventricular failure?
47. What are the factors on which coronary flow depends? What is the mode and variation in supply of coronary artery branches to cardiac muscle?
48. State the effects of severe hemorrhage?
49. What are the stages and causes of asphyxia?
50. Define ECG and state its clinical significance? What do the P, Q, RS, T, & Q RST waves represent?
51. What does P-R interval signify?
52. What do unipolar chest leads represent?
53. How is white line formed? What do you mean by triple response?
54. What is resting position of lungs, and what is the importance of

Intrathoracic pressure?

55. What are the functions of respiratory system?
56. What are the factors causing respiratory insufficiency?
57. What is Caisson and what is Caisson's disease ?
58. What do you understand by mountain sickness?
59. What are the various forms in which CO₂ is found in blood?
60. What is :
 - a. Respiration
 - b. Intrathoracic pressure
 - c. Pneumothorax
 - d. Haemothorax
 - e. Pyothorax
 - f. Tidal volume
 - g. Residual volume
 - h. Minimal volume
 - i. Complemental and supplemental volume
 - j. Respiratory minute volume
 - k. Vital capacity
 - l. FEV
 - m. Inspiratory and total lung capacity
 - n. Pulmonary compliance
 - o. Functional residual capacity
 - p. Pneumogram
 - q. Maximum breathing capacity
 - r. Alveolar air
 - s. Herring Breuer's reflex

- t. Charles, Boyles and Avegraolo's laws
 - u. O₂ dissociation
 - v. Cheyne – stoke breathing
 - w. Cyanosis
 - x. Breathing reserve
61. What are the effects of over ventilation? What are the conditions in which Dyspnoea is present?
 62. What are the various stages of asphyxia and causes of asphyxia?
 63. What are the factors causing respiratory insufficiency?
 64. Mention the different types of anoxia. Mention the different types of apnea?
 65. Differentiate between hydrostatic pressure and osmotic pressure.
 66. List the primary tissues of the body and their functions
 67. What are cilia and what is their function? In what areas of the body is ciliated epithelium present?
 68. List the areas of the body where the cell bodies of neurons are found.
 69. What is the advantage of transfusing whole blood rather than plasma?
 70. Why is it necessary to have a laboratory report on cross matching, blood groups and Rh factors before a transfusion is done?
 71. What is cross matching?
 72. What is believed to be the function of Thymus gland?
 73. Where and how would you place pressure to stop bleeding from an artery and vein?
 74. How would you know whether it is a vein or artery bleeding?
 75. What are difference in blood flow in arteries, veins and capillaries?
 76. What is meant by coronary and collateral circulation?

77. How does the arterial wall receive its nutrient?
78. Why does edema occur when the individual has a constricted tricuspid valve?
79. What effect does the increase of O₂ content of air have on blood?
80. What is the relationship between lung compliance and ventilation?
81. Compare the pressure gradients of O₂ and CO₂ in lungs and tissues?
82. What are the factors promoting erythropoiesis?
83. What is the structure of haemoglobin and discuss its fate?
84. What is the advantage of Hb being in cells and not in plasma?
85. Explain iron metabolism.

General Questions

1. Compare and contrast the composition of blood plasma and lymph.
2. How is the production of white blood cells, platelets and red blood cells adjusted to meet the varying needs of the individual? Name the humoral factors involved.
3. What are the tissue macrophages? What is their origin & how do they contribute to body defenses?
4. What is the clonal selection theory of antibody formation? What is the evidence for this theory?
5. What are the functions of natural killer cells? How do these cells differ from CD₄ and CD₈T lymphocytes?
6. Mutant genes that cause the production of abnormal hemoglobin are common in human beings. What determines whether a given mutation in hemoglobin is harmless or harmful?
7. Why is blood clotting abnormal in patients with vitamin K deficiency?
8. What is sinus arrhythmia? How is it produced? What is its clinical significance?
9. It takes several months for nerves to grow into transplanted hearts. However, before the nerves re-grow, patients with transplanted

- heart are able to increase their cardiac output when they exercise. What is the mechanism involved and how does it operate?
10. What is the Wind kessel? Why are the aorta and large arteries called Windkessel vessels? What is the physiological significance of the Windkessel effect?
 11. What is Bernoulli's principle? Discuss its significance in cardio vascular physiology.
 12. A young man has blood pressure of 130/75 mm. What is his pulse pressure? What is his mean arterial pressure? How did you calculate each of these pressures?
 13. What are Korotkoff's sounds and what produces them?
 14. Where in the cardiovascular system is turbulent flow normally found? What factors make flow change from streamline to turbulent?
 15. Discuss the law of Laplace as it relates to pulmonary function.
 16. In the standing position how does blood flow at the apex of each lung compare with blood flow at the base? How does ventilation compare? Explain the differences.
 17. What are the functions of epithelial cells and pulmonary macrophages?
 18. What is the difference between the anatomic and physiologic dead spaces? What role do they play in pulmonary disease?
 19. What factors affect the diffusing capacity of the lungs for O_2 ?
 20. Why is the Cl^- concentration inside red blood cells of venous blood greater than that of arterial blood? Describe the mechanism responsible for this difference.
 21. Why does oxyhaemoglobin bind less H^+ than reduced hemoglobin?
 22. What is the Bohr Effect? How is it brought about and what is its physiological significance.
 23. What are the Herring-Breuer reflexes?
 24. What role does the blood brain barrier play in the regulation of respiration?

25. What is Ondini's curve?
26. What is sleep apnea? Discuss its possible relation to sudden infant death syndrome.
27. What is the breaking point? Discuss the factors that affect it.
28. How does hypoxia generate increased numbers of impulses in the afferent nerves from the carotid chemoreceptors? Discuss the cellular and molecular mechanisms involved.
29. Discuss fatigue from the point of view of its causes, prevention and physiologic significance.
30. What is cheyne-stoke respiration? Explain its occurrence.
31. In patients with severe respiratory failure who are hyper-capnic and hypoxic, administration of O₂ may stop respiration and even cause death if artificial respiration is not instituted. Why?
32. With the development of SCUBA equipment, diving is performed not only by professionals, but has become a popular sport. Which medical problems can be caused by diving and how would you treat them?

General Questions

1. Why are Na⁺, K⁺ and ATPase important in physiology?
2. Compare the compositions of plasma interstitial fluid and intracellular fluid. Explain the difference.
3. What happens to resting membrane potential when the extra cellular K⁺ concentration is increased from 5 to 10 meq/L? What happens when the extracellular Na⁺ concentration is increased from 142 to 155 meq/L? Why?
4. Why do red blood cells swell and eventually burst when they are placed in a solution of 0.3% sodium chloride?
5. Genes dictate the formation of specification proteins. What are the steps between DNA and the formation of a protein that is secreted by the cell?
6. Discuss the functions of the protein found in the cell membrane?

7. What is the function of calmodulin? Why is this function important?
8. What is receptor mediated endocytosis?
9. Discuss aging from the point of view of its cellular and molecular bases, its physiologic consequences in humans and its implications for the practice of medicine.

Short Answer Questions

1. Which are the factors increasing the rate of lymph flow?
2. What is the composition of lymph?
3. Define edema and list out the causes and types of edema.
4. Define: a) R.E.S. b) Hemorrhage
5. Write the main functions of Reticulo-endothelial system and explain classification of histocytes.
6. Describe the effects of hyperventilation on respiratory centre.
7. How is blood restored after hemorrhage
8. Discuss physiological variations in B.P.
9. Describe the movements during respiration
10. Define and explain a) Internal speech b) Sensory aphasia c) Motor aphasia d) Dysarthria
11. Explain control of speech.
12. Classify epithelia according to their functions.
13. Write differences between plasma and serum.
14. Who brought forward the concept of homeostasis?
15. Define the terms a) eosinophilia b) Acidosis c) Alkalosis
16. What is the percentage of albumingm%
What is the percentage of globulingm%
What is the percentage of fibrinogengm%
17. Normal ESR at 1st hour in
New bornsmm (range)

- Adult males
- Females.....
- During pregnancy
18. Normal pH of blood is
19. Factor IV coagulation is
- Factor VII coagulation is...
- Factor III coagulation is
20. Write any three conditions in which blood volume is increased and decreased.
21. What is the basis of blood group classifications?
22. Discuss the significance of PQRST wave in ECG also the importance of P, R interval.
23. What are the changes seen in ECG in myocardial infarction?
24. Describe the types of hypertension.
25. Describe the role of red bone marrow in the development of blood cells.
26. In Benign hypertension, B.P. is aboutmm Hg.
- In malignant hypertension, B.P. is aboutmm Hg.
27. Describe the various tests for blood. How would you determine its sedimentation rate?
27. What is Haemolysis? Mention the factors that bring about Haemolysis.
28. Describe the function and properties of Hb.
29. Give a brief account of the theory of coagulation.
30. What are the effects of splenectomy?
31. Write the differences between R.B.C. and W.B.C.
32. Write a short note on blood bank.

Essay Type Questions

1. Give the composition of plasma and describe the functions of its proteins.
2. Give the histology of a living cell and briefly state the functions, particularly of the cell membrane and Nissl body.
3. Classify W.B.C.s and state their origin and functions.
4. Explain the development of RBCs in the human system after birth and various factors that influence its growth?
5. Describe the origin and development of RBCs.
6. Write short note on Jaundice. Which are the three types of jaundice?
7. Explain the metabolism and functions of iron.
8. What is anaemia? Which are the important etiological factors? Classify anaemia based on morphology of RBC.
9. Explain the process of inspiration and expiration.
10. What is haemostasis? Which are the events that occur in this?
11. What are the properties of cardiac muscle? Explain.
12. Define cardiac cycle. Explain ventricular systole. Which are the events during cardiac cycle? State the period for each phase of cardiac cycle.

Write short note on the following.

- a) Heart sounds
- b) Fetal circulation
- c) Coronary circulation
- d) Hepatic circulation
- e) Capillary circulation
- f) Renal circulation
- g) Cerebral circulation
- h) Periodic breathing
- i) Decomposition sickness

- j) Intrathoracic pressure
- k) Intrapulmonary pressure
- l) Mountain sickness

Essay Type Questions

1. What modification of the cell membrane of epithelial cells uses the surface area for absorption? Where is this type of modification found?
2. Compare the types of muscles and indicate how their structure correlates well with their function?
3. Compare and contrast cartilage and bone in relation to structure and function?
4. Describe the structure and function of serous and cutaneous membranes.
5. Compare and contrast the physiological activities of the human body and those of the individual cell
6. List and give the function of organic compounds that make up the cell.
7. What are organelles? Name them and give their function.
8. What are inclusion bodies? Give some examples and list their function.
9. What are the characteristics of H_2O and colloids that make them so important in physiology?
10. Name and describe the process that is included under passive transport across cell membrane and the source of energy used by a cell.
11. Discuss the nature and function of enzymes.
12. Briefly, describe the events of mitosis.
13. Explain the structure and function of DNA and RNA.
14. What are the processes of active transport across cell membrane?
15. What are antibodies? Are they harmful/helpful? In what ways?

16. Which hormones affect the heart rate? Explain.
17. Explain the value of an E.C.G.
18. How does heart influence blood flow?
19. What changes in blood composition occur as it circulates through the following organs – right heart, lungs, liver, kidney, adrenal glands.
20. What are the factors that maintain and modify arterial and venous pressure?
21. How would exercise, rest and sleep each affect heart rate?
22. List four factors that influence respiration rate and depth. By what means is this influence mediated?
23. Discuss the nervous control of respiration along with chemical control.
24. What is a) Methaemoglobin b) Carboxy-Hb c) Oxy -Hb
25. List out the factors that prevent and accelerate blood coagulation.
26. Write short note on :
 - a. Erythroblastosis foetalis
 - b. Blood transfusion
27. Discuss body fluids a) Classification b) fluid balance in three compartments c) various factors on which fluid balance in body depends.
28. Describe formation of lymph.

Essay Questions

1. Name the different fluid compartments in the body, the size of each and ways in which their sizes can be measured.
2. Define moles, equivalent, and osmoles.
3. List and compare the various passive and active forces that produce movements of substances across cell membrane.
4. Define osmosis and give examples of its role in moving fluid from one location in the body to another.

5. Describe and give example of secondary active transport.
6. Define and explain the resting membrane potential.
7. Know the various organelles in cells and the functions of each.
8. Know the chemical nature and physiologic significance of the compounds that make up the cell membrane.
9. Understand in general terms, the structure of DNA and RNA and the role these nucleotides and other substances in the cell play, in the process of protein synthesis.
10. Define the processes of exocytosis and endocytosis and describe the contribution of each to normal cell function.
11. Describe the principal ways that the chemical messengers in the extra cellular fluid produce changes inside cells, including changes in gene expression.
12. List the principal families of receptors.
13. List the main theories advanced to explain aging.
14. Define homeostasis and give examples of homeostatic mechanisms.

Essay Questions

1. List the various types of cells found in blood and precursor cells for each type.
2. Describe the functions of neutrophils
3. Describe the functions of Monocytes
4. Describe the essential components of human immune system including the cells involved and the mechanisms responsible for humoral and cellular immunity.
5. Describe the structure and functions of platelets and the way they discharge their granules.
6. Summarize the functions of red blood cells
7. Name the common blood types and describe how blood is typed and cross matched.

8. Describe the clotting and anti clotting systems and the clinical importance of each systems.
9. Describe the structure and function of the conduction system of the heart and compare the action potentials in each part of it with those in cardiac muscle.
10. Describe the way the ECG is recorded the waves of the ECG and the relationship of the ECG to the electrical axis of the heart
11. Name the common cardiac arrhythmias and describe the processes that produce them.
12. Know how and when to carry out cardiac massage
13. Describe the sequence of the events that occur in the heart during the cardiac cycle.
14. Outline the changes in the duration of systole and diastole that occur with changes in heart rate and discuss their physiologic consequences.
15. Describe the arterial pulse and jugular venous pulse.
16. Describe and explain the first and second heart sounds and the occasionally observed third and forth heart sounds.
17. State the timing of the murmurs produced by aortic stenosis, aortic insufficiency, Mitral stenosis and mitral insufficiency.
18. List the factors affecting cardiac output and the effects of each.
19. Summarize the factors governing oxygen consumption by the heart.
20. Describe in relative terms the diameter, wall thickness and total cross sectional area of the aorta, smaller arteries, arterioles, capillaries, venules and veins.
21. Describe the relationship between flow pressure and resistance in the vascular system.
22. List and assess the methods commonly used to measure blood flow.
23. Define laminar flow and critical closing pressure.

24. State Poiseuilles-Hagen formula for flow in blood vessels and explain based on this formula, why the radius of a vessel is such an important determinant of flow.
25. Define the law of Laplace and list three example of its operation in the body
26. Describe in detail how blood pressure in humans in measured by the auscultatory method and the palpation method.
27. Give approximate values for blood flow per unit weight and blood flow per organ at rest in the major organs of the body.
28. List the unique gross and microscopic aspects of the circulation of the brain.
29. Describe the formation, absorption and functions of cerebrospinal fluid.
30. Describe the circum-ventricular organs and list their general functions.
31. Summarize the main anatomic features of the coronary circulation.
32. List the chemical and neural factors that regulate the coronary circulation and describe the role of each.
33. Outline the unique features of the circulation of the liver and the splanchnic bed and understand the reservoir function of the splanchnic circulation.
34. Describe the triple response produced by firmly stroking the skin and explain each of its components.
35. Describe the operation of the placenta as the fetal lung.
36. Diagram the circulation of the fetus before birth and list the changes that occur in it at birth.
37. Define partial pressure and calculate the partial pressure of each of the important gases in the atmosphere at sea level.
38. Draw a graph of the changes in intrapulmonary and intra-pleural pressure and lung volume that occur during inspiration and expiration
39. List the passages through which air passes from exterior to alveoli

- and describe the cells that line each of them.
40. List the major muscles involved in respiration and state the role of each.
 41. Define tidal volume, inspiratory reserve volume, expiratory reserve volume and residual volume and give approximate values for each in a normal adult.
 42. Define compliance and give examples of disease in which it is abnormal.
 43. Describe the chemical composition and function of surfactant.
 44. List the factors that determine alveolar ventilation.
 45. Define diffusion capacity and compare the diffusion of O₂ in the lungs.
 46. Compare the pulmonary and systemic circulation listing the main differences between them
 47. Describe the metabolic functions of the lung
 48. Describe the relation of O₂ with hemoglobin and the oxygen-hemoglobin dissociation curve.
 49. List the important factors affecting the affinity of haemoglobin for O₂ and physiologic significance of each.
 50. Identify the location and function of the dorsal and ventral groups of respiratory neurons, the Pneumotaxic center and the Apneustic center in the brain stem.
 51. List the specific respiratory functions of vagus nerve and the respiratory receptors in the carotid body, the aortic body, and the ventral surface of medulla oblongata.
 52. Describe and explain the ventilatory responses to increased CO₂ concentrations in the inspired air.
 53. Describe and explain the ventilatory responses to decreased O₂ concentrations in inspired air.
 54. Describe the effect of each of the main non-chemical factors that

influence respiration.

55. Describe the effect of sleep on respiration.
 56. Describe the effects of exercise on ventilation and O_2 exchange in the tissue.
 57. Define hypoxia and describe its four principal forms.
 58. Describe the acute effect of high altitude on respiration and discuss acclimatization to altitude.
 59. Define and give examples of ventilation perfusion imbalance.
 60. List and explain the effect of carbon monoxide on the body.
 61. Summarize the abnormality that occurs in emphysema and asthma.
 62. List and explain the adverse effects of excess O_2
 63. Describe the effects of Hypercapnoea an Hypocapnoea and give examples of conditions that can cause them
 64. Define periodic breathing and explain occurrence in various decrease states.
 65. Describe in detail the technique of mouth-to-mouth resuscitation and explain how it maintains life.
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1. Describe the mechanism of normal respiration.
 2. Give an account of the transport of CO_2 in blood?
 3. Describe the reflex control of respiration.
 4. Describe the mechanism of ordinary respiration. What are the factors playing at (a) slow and gradual ascent and (b) rapid aerial ascent and how adjustments are affected?
 5. Describe the different types of respiration seen under normal conditions and mention the factors that determine each type
 6. Describe the various stages of asphyxia? How does it differ from anoxia?

7. Describe the factors concerned in maintaining and regulating the rhythmic movements of respiration.
8. Describe the mechanism of gaseous exchange in lungs and tissues? How is O₂ carried in blood?
9. Describe the effect of respiration on circulation?
10. Write what you know about the respiratory centers in brain responsible for maintaining and regulating the rhythmic movements of respiration.
11. What factors determine the dissociation of O₂ from the blood?
12. Describe the origin and fate of CO₂ produced in the body?
13. Describe the chemical control of respiration.
14. Discuss the uptake of O₂ by blood and the factors that determine its dissociation.
15. What is the importance of CO₂ in the body?
16. Describe the nervous control of respiration.
17. What happens when blood passes through the lungs?
18. Draw the O₂ dissociation curve of blood and discuss its significance.
19. Describe the effects of staying at Nainital for two months?
20. Give an amount of anoxia?
21. Give an amount of apnea and its causes.
22. Describe the mechanism of normal inspiration and expiration. Define the various abnormalities of respiration.
23. What is venous pulse? Draw a typical venous pulse tracing explaining the various waves on it.
24. Give an account of the nervous control of heart.
25. Describe the coronary circulation
26. Describe the mechanism of regulation of heart rate?
27. Give an account of the factors, which regulate cardiac output.

28. Describe the radial pulse and the method by which it can be studied in man?
29. Write what you know about the human electrocardiogram.
30. Discuss briefly the effect of exercise on circulation.
31. Describe the histology and properties of cardiac muscle.
32. Describe the method of determining blood pressure of a human being what is meant by pulse pressure. What is its range in a normal man?
33. Describe the reflex control of blood pressure.
34. Discuss the mechanism of nervous and chemical control of cardiac activity. What is the normal heart rate in man?
35. Define arterial pulse. Mention the points you would note in examining the pulse. Draw a typical pulse curve and explain the various waves on it.
36. Give a short account of the factors that regulate cardiac output. Describe one method by which it is determined in man.
37. Give an account of the cardiac inhibiting reflexes and the part they play in regulating the activity of the heart.
38. Discuss the effects of hemorrhage on cardio vascular system.
39. Describe the factors concerned in the maintenance of arterial blood pressure.
40. State and explain the effect of a greatly diminished elasticity of aorta and longer systemic arteries on (a) Pulse pressure (b) Velocity of arterial pulse and (c) character of blood flow in capillaries.
41. Give an account of heart sounds.
42. What is carotid sinus? Give an account of its functions.
43. What do you know of cardiac reflexes?
44. Compare the carotid arterial pulse with the jugular venous pulse. How these pulsations are related to the events occurring in the

heart?

45. Describe the origin and mode of transmission of the heartbeat.
46. Describe the functions and modes of actions of the different afferent nerves from the heart and the adjacent blood vessels.
47. What is venous return? Give the physiological factors that influence the flow of blood in the veins.
48. Discuss the role of Sino-aortic nerves in regulating certain vital functions of the body?
49. Trace the course of cardiac impulse, giving proofs in support of your statement.
50. Discuss the physiological changes occurring in the body at high altitudes.
51. What factors determine the dissociation of CO₂ in the blood?
52. What is anoxia? Describe different forms of anoxia. How would you differentiate it from asphyxia?

Short Notes (Modern)

1. Explain the stages of coagulation of blood and coagulants?
2. Explain control of respiration
3. Write short note on Apnoea.
4. Write short notes on Asphyxia.
5. Explain the Ductus venosus.
6. Write short note on Tidal volume
7. Explain Erythropoiesis.
8. Explain the classification of leucocytes.
9. Write short note on formation of speech.
10. Explain lymph formation and its functions.
11. Explain the formation of haemoglobin.
12. Write short note on blood grouping.

13. Write short note on cardiac centre.
14. Write short note on Cheyne-stoke respiration.
15. Explain larynx (short note)
16. Explain blood groups.
17. Define lymph, its composition, formation and function.
18. Explain how haemoglobin is recycled.
19. Define Fibrinolysis and describe its mechanism.
20. Write short notes on Erythroblastosis Foetalis.

Conventional questions set module-wise

Module -1

1. What is the concept of "Prakruthi"? Enlist the contributing factors in its formation ?
2. Define Purusha and describe Lokapurusha Samya.
3. Write short notes on Sareera.
 1. Give a brief note on different purushas explained by Charakacharya. Justify the importance of Shad Dhadhu Purusha in Ayurvedic view.
 2. Describe Sareera Vridhikara Bhavas.
1. Write about the relations of Panchabhutas with Dosha, Dhadhu and Mala.
2. Write about Tridhadhu Purusha.
 1. Define Kriyakala. Give a clear picture of Doshas and dushyas in Sthana samsrayavastha.
 2. Describe formation of Vatha, Pitha and Kapha during digestion and describe Pitha.
 3. Short note on Pitha bhedas and Trigunas.
 4. Describe Vayu Swaroopasthana and its functions in detail.
1. Define Sareerakriya and explain relationship between Doshas,

dhadhus and malas with panchamahabhutas.

2. Write types of Prakruthy and Lakshanas of Pitha Prakruthy
3. Sadhaka pitha and its functions.
 1. Explain Dhadhu Malas of Rasa and Raktha.
Short note on Dhadhu Mala.
1. Discuss Lakshanas of Swabhavika and Vikritha Moothra.
 1. Relationship between Trigunas and Tridoshas.
 2. Chikitsadhikritha Purusha
 3. Short note on Dhadhu malas
 1. Iti Bhoota Maya Deha- Explain.
 2. Explain Dosha Dhadhu mala moolatkatwa of Sareera.
 3. Prakruthy Saptho Dhadhu. Explain.
 4. What are the Sadharmya and Vaidharmya of Prakruthy and Purusha? Explain.
 5. {} I rXn
 6. {} I rXn k m[A½yw.....
 7. Relationship between Dhadhu and Upadhadhu Function of Upadhadhu.

MODULE – II

1. Explain the Nirukthi, Guna, Karma, Bhedas and Vridhi Lakshanas of Kapha Dhosha
2. Write short notes on (a) Triguna (b) Pitha bhedas.
3. What are the importance of Vatha among Tridosha?
4. Write notes on (a) Tristhoona
5. hmXS finÂ k am\-\pw,] n - - nÂ cR Ppt hpw, I ^ - nÂ I tfZI hpw k Zm tcmKI mcnl fmbn Ø nXn sNç p¶ p. F ´ psI m?
6.] I rXnk] X tZm[nX - hni Zamj pt .
7. Write the Vridhi kshaya lakshanas of Doshas.

8. Describe the classification and functions of Doshas.
9. Divisions of $hmXw$, $]n^w$, I^w and functions of each.

MODULE – III

1. What are the indications for artificial respiration? Explain the non mechanical methods of artificial respiration
2. Pranayama in respiratory and cardiac activities.
3. Write short note on Swasavarodham
4. Write short note on Pulmonary volumes capacities.
5. Narrate the Swasana prakriya – Niyanthrana (Regulation of respiration)
6. Write short note on Swasana yantra.
7. Write about Swasa praswasa prakriyas.
8. Describe Vayu Swaroopasthana and its functions in detail.
9. Explain sthana of pranavaha Srothas and its Dushti lakshana.
10. Regulation of respiration. Explain.
11. Write short notes on tidal volumes.
12. Write functions of Prana and Udana vayus with their Sthana.
13. Write the functions of Puppusa with a neat diagram.
14. $\{] mW\emptyset m \setminus \S \ddot{A} Gh? F \acute{ } psl m\text{-}hsb A \{] I mcw] cñKWñ$
 $i p^ñ p$
15. Which are the factors control respiration ?
16. Explain chemical control of respiration.
17. Write short note on Vital capacities.
18. $t\{k mX\acute{E} is\hat{a} \setminus rcp\hat{a} n F gpXñ \{] mW hmbpñis\hat{a} [\ddot{A} \frac{1}{2} \S \ddot{A} F gp$
 $Xpl .$
19. Which are the muscles of respiration ? How they control respiration. Explain
20. Exchange of gases in lungs.

21. Explain pressure changes during respiration
22. Write short note on larynx (Swarayantram)
23. Explain the transport of O₂ and CO₂ by blood and their exchange at tissue level.
24. Narrate regulation of respiration
25. Write in detail about Swasapraswasa kriya.
26. What are the indications of Artificial Respiration. Explain the non-mechanical methods of artificial respiration.

MODULE – IV

1. Write the functions of Udana vayu with their Sthana (seats).
2. Describe Swaroopasthana of Udana vayu and its functions
3. Describe the relation between Udana vayu and Pranavayu in the control of cardiac functions with the help of current principles of physiology.
4. Write about the Sthana and Karma of Udana vayu and describe voice production briefly
5. Describe about Broca's area and its functions?
6. What is meant by Reticular formation?
7. What is cerebral dominance?
8. What is Reticular Activating System (RAS) ?
9. Describe about Wernicke's area (Posterior language area)?
10. Write a short note on Aphasia?
11. Differentiate non-fluent aphasia and fluent aphasio?
12. A person suffered from CVA (stroke) and has difficulty in moving his right arm and also has speech problems. Which areas of the brain were damaged by the stroke?

MODULE – V

1. What are the importance of Vatha among Tridoshas. Write the

functions of Vyana vayu.

2. Short note on :- (1) Cardiac cycle. (2) Conducting system of heat
3. Describe the relation between Udana Vayu and Vyana vayu in the control of cardiac functions with the help of current principles of physiology
4. Define that Hridkarya charaka (Cardiac cycle). Explain various events.
5. Short note on (a) Korotkoff sounds (b) Coronary circulation (c) Portal circulation
6. Rasa grandhi and Rasayana varnam (Lymph glands and muscles) (June 2002)
7. Short note on Sira
8. 4 types of Siras and Lakshanas
9. Properties of heart muscle.
10. Lymphatic circulation
11. Short note on – Blood pressure
12. Write about Hrudaya dwani
13. Define Blood Pressure. Reasons for increase and decrease of blood pressure.
14. Properties and functions of cardiac muscle
15. Explain pericardium
16. Functions of cardiac muscle
17. Explain the functional anatomy of heart and cardiac cycle.
18. Cardiac pressure
19. Short note on Blood Pressure and regulation.
20. Describe the relation between Udana Vayu and Vyana Vayu in the control of cardiac functions with the help of current principles of physiology

21. Explain the functions of Hrudaya with the help of a neat diagram.
22. Explain heart sounds
23. Describe the special functions of Vyana Vayu
24. What are the control mechanisms of blood flow?
25. ECG interpretation
26. Functions, Production, Circulation and fate of Cardiac System.

Additional Questions

1. Explain Normal ECG.
2. Explain regulation of heart rate.
3. Give a short note on arrhythmia.
4. Give a short note on congenital. Heart defects.
5. Short note on – Haemodynamics
6. Give a brief description on circulatory shock.
7. Short note on systemic circulation.
8. Brief description of conduction of cardiac impulse.
9. Define cardiac output and describe the factors that effect.
10. Define Tachycardia and Brachy cardia.
11. What is meant by stroke volume
12. Short note on Pulse Pressure.

MODULE – VI

1. Explain Dhatwagni Paka in detail.
2. Describe Sareera Vridhikara Bhava.
3. How does sara and Kitta get separated during digestion ?
4. What is deglutition? Write stages and mechanism of deglutition ?
5. Describe the formation of Vata, Pitha, Kapha during digestion and describe Pitha.
6. Note on (a) Grasamik (b) Prathihasi (c) Movement of large intestine

(d) Bile

7. Write about Kshira Dhadhi Nyaya.
8. Describe Ahara Parinamam with relation of Dosha bhedas.
9. Explain Dhatwagni in brief.
10. Name different Grandhi srava of Ahara Panchana and discuss one of
11. the Grandhi srava (glandular secretion)
12. Draw diagram of Grandhi (duodenum) and write its main functions.
13. Explain Antharagni and Bhootagni
14. Describe the function of Agnayasaya (pancreas)
15. Enlist the type of intestinal juices and discuss its role in digestion.
16. Write in brief about Jeevanya Tatwa (Vitamins)
17. Explain Trividha Nyayas about the process of transformation of the different tissue elements.
18. Write short notes on (a) Achapittam (b) Prasada (c) Salivary glands (d) Grahani
19. B I mc] cñWmaI c ' mhS Ä
20. B ami b ck - ñÃ ASS ñbñññ pñ enzymes GsXÃmw? B I mc] N\ - ñÃ A hñññ pÅ] ; v
21. PohI S Ä F ñ me ´ ð GsXÃmw? cã kñ µs - k I mñññ pñ PohI s - hññññ pñ
22. bl r - ñsã [Ä½w hññññ pñ .
23. eL p hoi Zol cWw : (a) DWW pñ] pOw (Vermiform appendix) (b) Tidal volume (c) ZE ñWm-fñµw (Right atrium) (d) Ductus venosus
24. [mXp] cñWma(I aw hññññ pñ .
25. tZmj S fpw [mXpñ fpw X½ñepÅ B {i ðm{i ðñ' mhw hññññ i pñ

26.] mNI má nbpsS I À½§ sfs´ Āmw?
27. Write is Agni and write its Bhedas?
28. Explain Nishtapaka and Avastha paka ?
29. Describe the function of small intestine
30. State the physiological anatomy of the portal vein (Prathiharini sira) and its relation with the Rasa dhathu formation.
31. Write short notes on :
 - (a) Spleen
 - (b) Constituents of gastric juice
 - (c) Movements of large intestine
 - (d) Absorption
31. Give a brief notes on Vitamins and their functions
32. Write about Dhadhu malas in detail.
33. Write short notes on (a) Rasa prapa (Cystema chyll) (b) Anthra rasa (Saccus entericus)
34. Describe the functions of Brihadanthra (L-intestine)
35. Explain the Kedara Kulya Nyaya
36. A á ymi b- nse \nt{k mX {KÙ n GX? A hbpsS {k h§ Ā GsXĀmw? {k h§ fpsS [] hĀ- \w hni Zol ci; pt .
37.] qcoj cq] ol cW {} {l nbbspw] qcoj \nĀl cW {} {l nbbspw hnhci; pt .
38. PohI w D bpsS A ' mh- nepm- p¶ tcmK§ tfh ? PohI w D i coc[] {l nbsb
39. F § s\ k l mbi; p¶ p.
40. cpà ck -k whI Ww F {} t mcsa¶ vnhci; pt .
41. hZ\- nepw B ami b- nepw sh' pĀ B l mc-] N\ s- hnhci- i pt .
42. k] X [mXp; fñĀ Hmtcm¶ nsâ bpw] cñWma- nep- p¶ ae-

§ tffh?

43. ck-[mXphnsâ DÂ]- n.
44. N(hW-[A½w \nÀhI n; p¶ t] i n Ä Gh? (Mastication)
45. Classify food items according to Swaroopa?
46. Give a short note on Pachakagni
47. Compare digestion in mouth with Ayurvedic digestion
48. Describe mechanical and absorptive process of stomach.
49. Write the regulation of secretions of small intestine.
50. What are the compositions of gastric juice
51. Describe the movement of gall bladder.
52. Mechanism of defecation
53. Mechanism of absorption of carbohydrates.
54. Fat absorption
55. Deficiency signs of Vitamin D.
56. Role of Vit B₁₂ on carbohydrate, protein and fat metabolism.
57. Define Agni and its types.
58. Give a short note on Pachakagni
59. Criticize the liquid nature of Jadaragni.
60. Write inter relation between Pachakagni and Dhatwagni.
61. Describe digestion in Ayurvedic term.
62. Elaborate Bhutagin vyapara
63. Describe Vipaka.
64. Write the production of Doshas from food.
65. What are different types of Kushta
66. Describe various nyayas in dhadhu paka kala.
67. Write a short note on bile.

68. Write shortly about bile salts and pigments.
69. Write mechanism of secretion of gastric juice.
70. What are the nervous and chemical mechanism of pancreatic secretion.
71. What are the gastro intestinal hormones – write their control over secretions of intestines.
72. Which types of movements are observed in small intestine
73. Define deglutition
74. Write about the control mechanisms of pyloric sphincter.
75. Write the digestion proteins of large intestine.
76. How are fats absorbed.
77. Briefly write the forms in which proteins are absorbed.
78. State the role of endocrines and intestines on carbohydrate metabolism.
79. Write the functions served by amino acids.
80. Salts give no energy - Yet why are they essential for our life?
81. What are the sources distribution and function of potassium.
82. Describe the excretory functions of liver
83. Write a short note on jaundice.
84. What investigations are to be done to test the metabolic function of liver.
85. Write the mode of action and deficiency sign of Vitamin D.
86. What are the proteins of distribution of Vitamin K.
87. Describe digestion, absorption and utilization of carbohydrates.
88. Which are fat-soluble and water-soluble vitamins? Write short notes on Beri-beri and pellagra?
89. Write down types of Agni according to Charakacharya.
90. Describe the function of Jadaragni.

91. What are the main functions and composition of saliva?
92. Explain Ahara Parinamakara Bhavas.
93. Explain Dhadhu Poshana by Annarasa according to Charakacharya with the help of different nyayas.
94. Write functions of liver.
95. Write short notes on Exocrine functions of pancreas.
96. Describe Portal circulation.
97. Draw the sagittal section of tooth and give names of different types of teeth according to
98. Ayurvedic concept.
99. Describe the Lipids Metabolism
100. Explain the role of Samana Vayu and Apana vayu in the process of Aharapachana
101. Agni - definition, function, classification and relation.

MODULE – I

1. Narrate Twak Sara purusha lakshana ?
2. Cause for 3 Srothabodha
3. Define lymph? Describe its composition, formation and function
4. Mention of Kshya Vridhi Lakshanas of Rasa dhadhu
5. Give the names of principal lymph trunks and describe the lymphatic drainage of neck
6. Define lymph. What are the factors maintained by flow of lymph
7. What are the importance of Rakta dhatu
8. B I mc ck s⁻ \oÀhNn^{iv} ck-[mXphnsâ hym] Xn{I aw hni Zamj pl .
9. Xzj vF {X hn[w? GsXÃmw? A hbpsS {} [m\ [À½§ Ä Gh?
10. t{k mXÊv F ¶ msc-´ P A hbpsS k wJy? Zpj Sn eE W§ Ä, {} [m\yw F ¶ nh hyà amj pl .

11. Write short note on Lymphatic circulation
12. ck [mXphisâ DÂ] - ñ F S ñs\?
13. ck - ñsâ eÉ Ww.
14. Explain "Rasa grandhi"
15. Explain "Rasapradoshaja vikaras"
16. Explain flow of lymph.
17. Explain lymph nodes
18. Explain lymph capillaries.
19. How is lymph formed.
20. Describe the formation of Rasa dhadhu from food
21. Write the importance of Rasa dhadhu
22. Define Srodha. Write the Ayurvedic aspects of Rasa Vaha Srothas.
23. What are the proteins of Rasa dhadhu
24. How can we determine normal and abnormal state of Rasa dhathu.
25. Define Sara and describe Twata sara purusha lakshana.
26. What are the properties of Rasa dhadhu
27. Describe the process of tissue fluid formation and its functions.
28. Narrate theories regarding capillary exchanges with its pathological states.
29. How is lymph formed describe properties to composition of lymph.
30. What are the functions of lymph.
31. Explain the function of spleen.
32. Explain the functions of R.E. systems.
33. Define "Sara"

MODULE – II

1. Explain how haemoglobin is recycled.
2. Define fibrinolysis and describes its mechanism

3. Write panchabhoutikatwa of Raktha, dhathu.
4. Explain Sudha raktha lakshana
5. Write short notes on : Swedha lama (WBC) Raktha chakrita (Thrombocytes)
4. Explain Raktha skandana and raktha srava (bleeding and clotting)
5. Mention the upadhadhu of raktha and medodhathu
6. Write about any one of the upadhadhu
7. Explain raktha chapa in brief (BP)
8. Write Shudha raktha lakshanas and the karyas of raktha Dhathu
9. Describe haemostasis and its mechanism.
10. Erythroblastosis foetalis
11. Explain raktha varga (Blood groups)
12. What is the importance of Raktha Dhadhu? Define coagulation and describe its mechanism.
13. How we can determine the purity of blood?
14. Write about the viscosity of blood.
15. Importance of E.S.R.
16. Describe coagulation of blood.
17. What are the factors preventing Hastenn's coagulation
18. Coagulation of blood volume.
19. What is the fate of R.B.C.
20. Synthesis of Haemoglobin
21. Iron metabolism
22. Different types of anaemia
23. Classify different W.B.C.
24. How is Vestibulochochlear nerve able to perceive hearing and balance?
25. What is the importance of Raktha dhatu?

26. Define Srothas. Types of Srothas and distinguish them.
27. Clotting factors and stages
28. Define Srothas. What are they?
29. Define Fibrinolysis and describe its mechanism.
30. Explain the Raktha Varga (Blood groups)
31. Explain raktha skandana Prakriya (Coagulation of blood)
32. Explain raktha sara purusha lakshanas.
31. Describe Vridhi Kshaya lakshanas of raktha.
32. Explain formation of blood.
33. What are specific functions of blood?
34. Mention different types of anaemia. Write down their causes.
37. Mention the genesis and functions of various blood cells
38. Short note on Raktha Vaha Srothas.
39. Define the formation of Raktha dhadhu under Ayurvedic perspective.
40. Write the importance of Raktha dhadhu
41. How we can determine the purity of blood
42. What are the symptoms produced on the increase and decrease of Raktha dhadhu
43. Describe the symptoms of raktha rasa purushas.
44. Write the composition of blood
45. What are the plasma proteins and their functions.
46. Write a short note on viscosity of blood.
47. Write the importance of E.S.R.
48. What are the factors preventing and hastening coagulation.
49. Write about to regulation of blood volume
50. Describe the development of R.B.C.
51. Narrate Iron metabolism or its functions.

52. Differentiate different types of anaemia and classify different W.B.C.
53. Explain intrinsic mechanism of coagulation of blood
54. Write short notes on :
 - a) Plasma proteins
 - b) E.M.G.
 - c) anaemia
 - d) Mechanism of muscle contraction
55. Write Normal values of :
 - a. Cholesterol differential
 - b. Calcium
 - c. RBC
 - d. WBC
 - e. Albumin
 - f. Platelet count

MODULE – III

1. Write Mamsa Peshi Soothrarya Swaroopa, Sthana and Karma.
2. List the Lakshanas of mamsa sara purusha.
3. What is muscle tone and how does ATP function in muscle contraction
4. Write short note on depolarization.
5. Mechanism of muscle contraction
6. Write the mamsa dhathu Uthpathi and its Vridhi , kshaya Lakshanas.
7. Describe the three main types of muscles and its characteristics.
8. Describe the morphology of skeletal muscle fibre. What are the effects of repetition of stimuli observation skeletal muscle?
9. Differentiate between isotonic and isometric contraction.
10. Write short notes on:
 - (a) Latent period of muscle contraction
 - (b) Refractory period of muscle contraction
11. All or none law
12. Fatigue
13. Explain electro myography (EMG)

14. Define muscle tone?
15. Write the formation of Mamsa Dhathu
16. Describe the functions of Mamsa Dhathu and its presentation in Kshaya vidra avasthas.
17. Describe muscle tissue in detail.
18. Narrate origin and symptoms of Mamsa sara purusha.
19. Differentiate the structure of 3 kinds of muscle tissues.
20. What are the properties skeletal muscles.
21. What are the effects of repetitions of stimuli observed in a skeletal muscle.
22. State all or none law.
23. Define muscle.
24. What are the characters of isotonic and isometric contraction.
25. Enumerate the changes occur during muscular contraction.
26. Explain Mamsa purusha Lakshanas
27. Mechanism of muscle contraction.

MODULE – IV

1. Narrate causes of medhakshaya
2. Explain guna and karma of medho dhathu and write about medho vahasrothas.
3. Mention the Athivridhi lakshana of medha.
4. Mention upadhathu of raktha and medho dhathu. Write one of the Upadhathu.
5. What are the symptoms seen in Vridhi and Kshaya of Medho Dhathu.
6. Write a short note on Medho Dhathu Vridhi.
7. Write about the Swaroop of Medha

8. Explain Medha Sara Purusha lakshanas.
9. Write short note on triglycerides and its functions.
10. Write short note on atherosclerosis.
11. Write short note on different types of cholesterol and mention its normal value in the body
12. Explain fat metabolism by liver.
13. Explain adipose tissue and its functions and explain various types.
14. Write about phospholipids and mention phospholipids ratio of its functions.
15. Explain fatty acid synthesis write about various functions of fatty acids.
16. Explain the origin and site of fat.
17. Explain various functions of fat
18. What are ketone bodies, How do these interact with carbohydrate metabolism?
19. Explain sterols and cholesterol.
20. Describe medo dhathu. What are its proteins.
21. Write the formation of medo dhathu.
22. Describe medo vaha Srothas.
23. State Medo Vridhi and Kshira lakshana.
24. Describe the medo sara purusha.
25. Write normal values of Different factors of lipid in blood plasma.
26. What are the sources of fat how are fat distributed in the body.
27. State the role of endocrines on fat metabolism
28. State the functions of phosphor lipids.
29. Give a short note on steroids.
30. Describe the distribution, synthesis to excretion of cholesterol.

31. Critically analyze the interdependence of vatha Doshas and ash dhathu.
32. Write short notes on Medo Dhathu

MODULE – V

1. A Ø nk mc, aÖ mk mc] pcpj . mcpsS eE W§ Ä Gh?
2. A Ø n, i pl fW, F ¶| nhbpsS hr² nE b§ firÄ I mWp¶| hnl mc§ Ä Gh.?
3. Write Dhathu Sara lakshana of Asthi Dhathu.
Pohl w D bpsS A ' mh- nepml p¶| tcmK§ Ä Gh?
Pohl w D i coc{l nbl sf F § ns\k zm [o\ntj p¶| p.
4. Write the Swaroopa and Karmas of Asthi Dhadhu
5. What are Moolasthanas of Asthivaha Srothas?
6. Write the Uthpathi of Asthi dhathu and Asthi Vridhi, Kshaya lakshanas.
7. Brief notes on Vitamins and their functions.
8. Describe functions of bone marrow
9. Explain the ossification of bone.
10. Mention the causes of Asthivata Srotha dushti?
11. Explain 4 types of bone cells?
12. Explain how thyroid and parathyroid glands maintain calcium balance?
13. Describe composition of bone tissue?
14. Explain Asraya Asrayikhavam Asthivata.
15. Explain calcium metabolism and calcification of bone
16. Picturize an Asthi Sara Purusha.
17. What are the functions of bone marrow? Differentiate modern aspect to Ayurvedic view.
18. Describe the relationship between Asthi Dhathu and Vatha Dosha in detail.
19. Describe endochondral ossification

20. Explain the ossification of bone
21. Describe the properties and functions of bone marrow.
23. Short Note on Asthi dhathu

MODULE – VI

1. aÖ m[mXphısâ {} m[m\ I À½§ Ä Gh ? cà mWphısâ DÂ] .- ढbñÂ A Xısâ] s; ´ ¢
2. Describe swarooma of Majja Dhathu. Mention its important functions.
3. Differentiate between Peetha majja and Sarakta Majja.
4. Describe the causes for Majja Dhathu Dushti.
5. Describe the formation of Majja Dhathu
6. Describe the two types of bone marrow and its reticula endothelial functions.
7. Write about Majja Dhathu Vridhi and Kshaya and diseases produced due to Majja Dushti.
8. Describe types of bone marrow in Ayurvedic aspect.
9. Explain pH and Acid Base balance.
10. Define Fibrinolysis and describe its mechanism.
11. Explain how haemoglobin is recycled?
12. Explain the Raktha varga (Blood groups)
13. Mention Sudha raktha lakshanas.
14. Explain Raktha Skandana Prakriya (Coagulation of blood)
15. Explain Raktha sara purusha lakshanas.
16. Describe Vridhi Kshaya lakshanas of raktha.
17. Explain formation of blood.
18. What are specific functions of blood?
19. Mention different types of anaemia. Write down their causes.
20. Mention the genesis and functions of various blood cells.

21. Describe the causes for Majja dhushti

MODULE – VII

1. Name the parts of Shukra vatha Srothas? Write the Guna, Karma, Vridhi and Kshaya lakshana of Shukra Dhathu and its importance.
2. Explain the functions of Vrishana.
3. Factors influencing spermatogenesis?
4. Explain the formation of Shukra Dhathu.
5. Write a short note on pumbeeja.
6. Short note on Asthi Vrishanika (epididymus)
7. Explain the hormonal control of Testis.
8. What is semen? What are its functions?
9. What are the functions of each part of sperm cells?
10. Explain the spermatogenesis?
11. Explain Shukra Sara Purusha lakshanas.
12. Functions of sertoli cells
13. Temperature control of testis?
14. Explain physiological anatomy of testis.
15. Write about maturation and storage of sperm in epididymus
16. Explain the mechanism of erection and ejaculation.
17. Short notes on – Cryptorchidism, sterility, leydig cells.
18. State why Shukra dhathu of women is not given importance.
19. Differentiate the term Shukra dathu from Shukra.
20. How the purity of semen is tested ?
21. Factors influencing spermatogenesis

MODULE – VIII

1. Short notes on Ojus.
2. What are the Doshas of Ojus.

3. What are the gunas of Ojus?
4. What are the reasons for Ojakshaya? Describe Ojakshaya lakshanas.
5. Short notes on Vyadhikshamatwam
6. Define Oja and discuss sthanas of Oja
7. Define Oja. Describe Vikrithi of Oja
8. Short essay on Ojus Vyadhikshamatwam and its modern aspects.
9. What are Pushtikara bhavas of Oja?
10. What is Ojus? What is the relation between Ojus and Balam. Define Bala and classify it.
11. Explain para and apara ojus in detail.
12. How we can recognize Ojovyapat.
13. HmtPm, hr{k wk w, HmP-E bw F ¶ ih F § is\ Xicit' dñ-
bmw.
14. Describe Ojus and its importance.
15. Compare physical nature of ojus from different Ayurvedic classics.
16. How can we achieve Bala according to Ayurveda?
17. Cell mediated immunity – Describe.
18. Role of antibodies in body defence.
19. Short note on inflammation.
20. Role of lymphocytes in body defence mechanism.
21. What is meant by auto immune disorders?
22. Short note on immune deficiency diseases?
23. Explain fatty acid synthesis.
24. Compare the physical nature of ojus from different Ayurvedic classes.
25. Differentiate 2 types of Ojus.
26. Define Bala and classify it.

27. Differentiate Bala from Ojus.
28. Enumerate Bala Vridhi kara bhavas'
29. Which type of persons have reduced Bala – Describe.
30. Define Vyadhy Eka Matwa.
31. How can we asses Bala according to Ayurveda
32. Describe different type of immunity.
33. What are the role of antibodies in body defence.
34. What are the Pushtikara bhavas of Oja?

MOULE – IX

1. Describe the hormonal control of ovarian cycle
2. Describe Upadhatus and Dathumalas
3. Sthanya kshaya – symptoms and its management.
4. Explain how photo pigment respond to darkness and light
5. Short note on : (a) Arthavam (b) Melanin pigment (c) Oxytocin
6. Describe microscopic structure of ovary with the help of diagram
7. Brief note on Pumsavanam
8. Explain interdependence of Vatha and Asthi dhathu.
9. Describe different types of bone cells.
10. Explain calcium metabolism
11. Differentiate dhathu from Upa Dhathu.
12. When Upa Dhathu are produced. Describe .
13. What do these Upa Dhathu have in common?
14. Why the breast milk included in the class Upa Dhathu.
15. How is Sthanya produced. Explain under by perspective.
16. Give symptoms of Sthanya kshyas and its management.
17. Compare the production of milk in modern and Ayurveda views.

18. Describe the contents of breast milk and its importance.
19. Narrate Arthava kshyas and Vridhi lakshanas.
20. Briefly outline menstrual cycle.
21. Outline the layers of skin according to Ayurveda.
22. Compare the Twak with skin.
23. Describe the function skin.
24. Mention why Kandara sira and snayu cause under the per-view of Upa Dhathu.
25. Define Lactation. How is it controlled ?

MODULE – X

1. Explain the mechanisms by which the kidney help to control blood pH.
2. Describe the mechanisms of urine formation
3. What is Micturition? Describe the Micturition reflex
4. Narrate the functions of Vrikka
5. Mention Sareera Malas and Dhathu Malas and its Uthpathi.
6. Write short notes on Swedha grandhi.
7. Draw a neat diagram of Vrikka (Kidney) and explain its functions in brief.
8. Write about Sweda Uthpathi
9. Explain the formation of sweat
10. Formation of Sweat
11. Explain the functions of nephron (Vrikkanu) with the help of a diagram
12. Discuss the lakshanas of Swabhavika and Vikritha Moothra (Normal and abnormal urine)
13. Explain the formation of sweat
14. What is Micturition, Describe the Micturition reflex?

15. അക്സീറ്റിംഗിംഗ് സബ്സ്റ്റാൻസുകൾ ഉപയോഗിക്കുന്നത് എന്തുകൊണ്ട്?
16. അക്സീറ്റിംഗിംഗ് സബ്സ്റ്റാൻസുകൾ ഉപയോഗിക്കുന്നത് എന്തുകൊണ്ട്?
17. Formation of Urine.
18. Write down the importance of sweat in body temperature regulation.
19. Explain ahara malas and dhadhu malas.
20. What is the physiology of Interleukin-I ?
21. Define rennin – angiotensin pathway
22. What are local hormones? Hormonal control of sweat glands

MODULE – XI

1. Write a short note on Melanin pigment
2. How photopigments respond to dark and light?
3. Short note on colour blindness.
4. Point out Pratyeka Jnanendriya Kendrasthana
5. Functions of Karmendriya
6. Explain the mechanism of hearing Shravana jnana Prakriya
7. Name Jnanendriya and Karmendriya. Explain one of Karmendriyas.
8. Discuss Jnanolpathi Krama
9. What is intraocular pressure? How's canal of Schlemm related to this pressure ?
10. Define memory and explain its causes
11. Notes on auditory area
12. Explain mechanism of vision in detail
13. Explain the functions and working of olfactory nerve
14. Explain the position and function of Alochaka Pitha
15. Explain retina
16. Explain the working of ear
17. Establish the relationship between sense organs and Pancha

Mahabhoothas

18. Write about the functions of Twacha
19. Write the functions of Netrendriya (eye) with diagram
20. Classification of skin and their functions
21. Describe the Ekadasendriyas
22. Explain the order of production of skin, layers and write the functions and diseases produced on Mamsadhara Rohini (8 marks- April 1988)
23. Explain mechanism of taste Rasajnana Prakriya (5 marks-June 1995)
24. Explain the mechanism of olfaction
25. Explain the mechanism of tactile sensation.
26. Pathway of vision, audition, olfaction, tactile sensation, gestation.
27. Explain different types of taste buds.
28. Notes on visual area, olfactory area, taste area.
29. Short notes on : (a) Rhodopsin – Retinal Cycle (b) Adaptation

MODULE – XII

1. Types of synapses and its importance
2. Short notes on (a) Neuroglia (b) Shad chakras
3. Function of C.N.S.
4. Explain Ida, Pingala Nadi
5. Discussion of pyramid and its importance
6. Short note spiral nerves, Function of thalamus
7. Sushumna nadi (Spinal cord)
8. Functions of C.S.F.
9. Functions of cerebellum
10. Mechanism of taste
11. Define a reflex. How are reflexes related to haemostasis
12. What is reflex action ? Explain.

13. How many cranial nerves are there in the body? Which are they? Briefly describe each.
14. Functions of thalamus
15. Briefly describe A.N.S.
16. Location of Pons. Its importance
17. Describe subarachnoid space
18. What is meant by Wallerian degeneration?
19. What is blood brain barrier?
20. Describe the brain stem – its structure and function
21. Describe the limbic system
22. What are circum ventricular organ?
23. Write a short note on basal ganglia
24. What is meant by reticular activating system?
25. Describe the action of local anesthetics.
26. List the differences between epinephrine and norepinephrine
27. Write a short note on : (a) Broaca's area. (b) GABA Dopamine (c) IIIrd order Neurons
28. Types of synapses and its importance.
29. Short notes on: (a) Acid-base balance. (b) Neuroglia. (c) Non-rapid eye movement
- (d) Thyroxine. (e) Shadchakras. (f) Balam.
34. Write on parts of brain - Fore brain, mid brain
35. Write Meninges – CSF, Sinuses, Ventricles
36. Notes on Cranial nerves, organ, tract, supply, function.
37. Notes on Basal ganglia, Thalamus, hypothalamus.

MODULE – XIII

1. Short note on Manas

2. Explain Sukha and Dukha
3. Define memory and explain its causes
4. Explain functional areas (Motor and sensory) in the frontal lobe of cerebrum.
5. Short notes on Atma.
6. Short note on Non rapid eye movement sleep.
7. Write on detail about Nidra and Grandhis
8. Explain Sareera and Manas Dosha Paraspara sambandha .
9. Explain Swaroop Guna and Karma of Manas
10. Point out Pratheka Jnanendriya Kendra Sthana.
11. Write about stages of sleep and types of Nidra
12. Explain Atma lakshana
13. Explain Jnanendriya and Karmendriya. Explain one of Karmendriya.
14. Discuss Jnana Utpathi Karma
15. Write Stana, Guna and Karma of Manas
16. Explain Satvika, Rajasa and Thamasika Gunas.
17. Explain Nidratpatti Karma, write about Swabhavika and Vaikarita Nidra.
18. Write short note on Swapna.
19. \n{Z Dev] 9] aml p9] hn[w.
20. Ú mt\{ZnbS fpsS A ÅX-Y{Kl Ww F S ns\ \Sj p9] p.
21. at\mhl t{k mXÊ ns\ hnhcnj pl .
22. \n{ZbpsS KpWS Ä.
23. Explain Ekatwam and Anutwam of Manas.
24. Write Ekadesha indriyas and their Karmas.
25. Explain Anutwam and Ekatwam of Manas.
26. k varXnsb \ne-\nÅ⁻ p9] Xp sl mv k n² aml p9] KpWS -

संसर्ग आत्म?

27. Short note on Prana.
28. State in detail its connections with various parts of brain.
29. What is Limbic System? Which all parts of brain are involved in the system? State its overall activities.
30. Narrate a brief note on Sensory tracts
31. Describe role of Manas in (a) Imagination (b) Inhibition of special senses (c) Atma
32. Describe the relation and properties of Manas, Indriya Vishayas.
33. Explain the origin of sleep and its various types?
34. Explain the origin of dreams.
35. Describe Manovaha Srothas.
36. Narrate a brief note on Manasika Doshas
37. Write a note on : (a) Base of Prana (b) Bala attributed by Prana
38. Explain the desire fulfillment of Sadhaka pitha, based on Hrudaya
39. Describe the capability of influencing Indriya by Udana and Vyana Vatha
40. Write a short note on Sara and Asara
41. Write a short note on the relationship of Manasika Doshas and Sareerika Doshas.
42. Describe the versatility of Manas in the context of versatility of Purusha.
43. Write a short note on : (a) Learning (b) Intellectual function (c) Cerebral cortex.
44. Which parts of the brain are involved in short term memory and long term memory respectively?
45. What is the significance of P.R. interval?

46. Name all bipolar and unipolar leads in ECG
47. Name and describe the functions of various hormones produced by the Anterior Pituitary Gland.
48. Spinal cord - cross section – ascending and descending tracks.
49. Lobes -system
50. Motor – Pred association
51. Nervous – Association areas
52. Important areas – Wernicke's association area, Percentage motor sensory, Feed back mechanism
53. All or none theory – basin theories.
54. Functions, anatomy histology in brain.
55. Nidra – Definition, properties.

MODULE – XIV

1. Define hormone. State its functions
2. Define functions of pituitary gland or Piyusha grandhi.
3. Thyroid gland and its functions
4. What is the role of Bhrajaka Pitha ? How can this be correlated with endocrine action?
5. Narrate in brief. Sadhaka Pitha

Annexure – 4

SAREERA KRIYA PRACTICALS

PRAKRUTHA &VIKRUTHA LAKSHNAS OF DOSHA, DHATHU, MALA

(A). PRAKRUTHA LAKSHANAS OF DOSHA – DHATU- MALA

VATA

No. LAKSHANAS + -

1 DŌ ml w (Initiation to act)

- 2 DÑzmK w (Expiration)
- 3 \ni zmK w (Inspiration)
- 4 tNj v̄ (Activities of body, mind, speech)
- 5 {] k v] μ\W (Activities of the body)
- 6 thK{] hÀ⁻ \W (Expulsion of urine, faeces etc).
- 7 C{μnb] mShw (Clarity of sensorium)

PITHA

- No. LAKSHANAS + -
- 1]àn (Digestion)
 - 2 Dujvamhv (Warmth)
 - 3 ZÄi\w (Vision)
 - 4 A'n-emjw (Desire to fulfill wishes)
 - 5 £pXv Appetite
 - 6 XrjvW (Thirst)
 - 7 cpNn (Liking)
 - 8 {]'m-{-kmZw (Clear luster)
 - 9 ta[m (Intellect)
 - 10 [o (Knowledge)
 - 11 iucyw (Braveness)
 - 12 X\p-amÀ±hw (Softness of the body)

KAPHA

- No. LAKSHANAS + -
- 1 ØncXzw (Firm footed)
 - 2 kv\nKv²Xzw (Smooth and lustrous)
 - 3 kÔn-Ôw (Well knit joints)
 - 4 £a (Tolerance)

5 hrjX (Capacity to have sex)

RASA

No. LAKSHANAS + -

1 XpjuTn (Happiness)

2 {}oW\w (Comforting)

3 cã]pjuSn (Nourishing the Rakta)

RAKTA

No. LAKSHANAS + -

1 Poh\w (Life supporting)

2 hÅ® {}km-Zw (Clarity of colour)

3 amwkt]mjWw (Nourishing the Mamsa)

MAMSA

No. LAKSHANAS + -

1 tZI te]\w (Covering the skeleton)

2 ae]pjuSn (Nourishing the waste products)

3 taZ]pjuSn (Nourishing the body fat)

MEDHA

No. LAKSHANAS + -

1 t\{X kv\nKv²X (Unctuousness of eyes)

2 Km{X kv\nKv²X (Unctuousness of the body)

3 ZmÀVyw (Strength)

4 AØn]pjuSn (Nourishing the bones)

ASTHI

No. LAKSHANAS + -

1 tZI D̄m\ [mcWw (Supporting the physique)

2 aÖ t]mjWw (Nourishing the Majja)

MAJJA

- No. LAKSHANAS + -
- 1 kv\ñKv²X (Unctuousness of the body)
 - 2 _ew (Strength)
 - 3 AkvYn]pcWw (Filling the bone)
 - 4 ip\vf]p]vSn (Nourishment of reproductive tissue)

SHUKRA

- No. LAKSHANAS + -
- 1 lÀjw (Happiness)
 - 2 _ew (Strength)
 - 3 KÀt'm-ev]m-Z\w (Reproduction)

PUREESHA

- No. LAKSHANAS + -
- 1 Ah-jvTw'w (Supporting the body)
 - 2 A\ne [mcWw (Supporting the Vayu)
 - 3 A\-e [mcWw (Supporting the Agni)

MOOTRA

- No. LAKSHANAS + -
- 1 A¶] \nÀÆm-IWw (Regulation of Digestion)
 - 2 IvtfZ \nÀÆm-IWw (Regulation of water content)

SWEDA

- No. LAKSHANAS + -
- 1 IvtfZ [mcWw (Supporting the water content)
 - 2 XzN [mcWw (Supporting the skin)
 - 3 kv\l [mcWw (Supporting the unctuousness of the body)
 - 4 tcma [mcWw (Supporting the hair)

(B). VIKRUTA LAKSHANAS OF DOSHA – DHATU – MALA

VATA VRUDHI

No.	LAKSHANAS	+	-
1	ImÀiyw (Emaciation)		
2	ImÀjvWyw (Black colour)		
3	Km{X I¼w (Shivering)		
4	kv]pcWw (Fasciculation)		
5	DjvW ImanXm (Desire for hot)		
6	kwvÚm \miw (Loss of unconsciousness)		
7	\n{Zm \miw (Loss of sleep)		
8	_tem-]-LmXw(Loss of strength)		
9	C{µn-tbm-]- LmXw (Loss of sensorium)		
10	AØniqe(Bone pain)		
11	aÖtimjw (Dryness of marrow)		
12	aei (Obstruction of faeces)		
13	B[vam\w (Distinction of abdomen)		
14	BtSm]w (Movements with sound)		
15	tamlw (Delusion)		
16	ssZXyw (Apathy)		
17	'bw (Fear complex)		
18	timlw (Sorrow full)		
19	{]em]w (Delirium)		

VATA KSHAYA

No.	LAKSHANAS	+	-
1	{]tklw (Increased Salivation)		
2	AcpNn (Anorexia)		

- 3 IrÃmkw (Nausea)
- 4 kwÚ-mtamlw (Disturbed consciousness)
- 5 Aev] hm;v (Less speech)
- 6 Aev] tNjvT (Less activities)
- 7 A{]-IÀjw (Lack of interest)
- 8 AwK-kmZw (Debility)
- 9 Aán sshjyaw (In approximate digestive fire)

PITTA VRUDHI

- No. LAKSHANAS + -
- 1]n`XzNm (Light yellowish skin)
 - 2 ¥m\n (Tiredness)
 - 3 C{µnb ZuÃ_eyw (Weakness of sensorium)
 - 4 HmtPm hn{kww (Destruction of Ojus)
 - 5 ioXm-'n-emjw Desire for cold things
 - 6 Zmlw (Burning sensation)
 - 7 Xnàm-kyX (Bitter taste in the mouth)
 - 8 XrjvW (Thirst)
 - 9 aqÀO (Unconsciousness)
 - 10 Aev] \n{ZX (Reduced sleep)
 - 11 t{Im[w (State of anger)

PITTA KSHAYA

- No. LAKSHANAS + -
- 1 kvXw'\w (Stiffness)
 - 2 ssiXyw (Coldness)
 - 3 A\n-bX tXmZw (Uncontrollable pricking pain)
 - 4 Atcm-NIw (Anorexia)
 - 5 Ahn-]mIw (Indigestion)

- 6 AwK-]m-cpjyw (Roughness of the body)
- 7 l¼w (Shivering)
- 8 Kuchw (Heaviness)
- 9 \h-ip-lvfX (White nails)
- 10 \b\ iplvfX (White eyes)

KAPHA VRUDHI

- | No. | LAKSHANAS | + | - |
|-----|---------------------------------------|---|---|
| 1 | iuXyw (Whiteness) | | |
| 2 | ssiXyw (Coldness) | | |
| 3 | sØueyw (Obesity) | | |
| 4 | Bekyw (Lethargy) | | |
| 5 | Kuchw (Heaviness) | | |
| 6 | AwK-kmZw (Debility) | | |
| 7 | t{kmtXmhn-[m\w (Blockage of channels) | | |
| 8 | aqÀO (Unconsciousness) | | |
| 9 | X{µm (Stupor) | | |
| 10 | \n{Zm (Excessive sleep) | | |
| 11 | izmkm (Difficulty to breath) | | |
| 12 | Imkm (Cough) | | |
| 13 | {]tklw (Increased Salivation) | | |
| 14 | lrÃmkw (Nausea) | | |
| 15 | Aán-kmZw (Decreased digestive fire) | | |
| 16 | kÕn hniptfjw (Loosening of joints) | | |

KAPHA KSHAYA

- | No. | LAKSHANAS | + | - |
|-----|------------------------------|---|---|
| 1 | {'aw (Giddiness) | | |
| 2 | DtZz-jvT-\w (A type of pain) | | |

- 3 A\{Z (Loss of sleep)
- 4 AwK-aÅ±w (Body pain)
- 5]cn-]vtfmjw (Slight burning sensation)
- 6 tXmZw (Pricking pain)
- 7 Zh Zmlw (Excessive burning)
- 8 kv]mSw (Boils)
- 9 th]\w (Tremor)
- 10 [pa-bm\w (Feeling of hot fumes in the throat)
- 11 KÕn-ssi-Yneyw (Looseness of joints)
- 12 LrZ-b-{\Zhw (Palpitation)
- 13 ivtfjvam-ib ip\yX (Emptiness of organs of Kapha)

Annexure – 5

SAREERA KRIYA PRACTICALS

FORMAT FOR PRAKRITI PAREEKSHA

	Vata	Pitha	Kapha
1. BODY	" Lean " Weak Tall/Short Unshaped Prominent veins & tendons Cold in touch Rigid Rough Un proportionate Undernourished	Medium Fleshy Delicate Unshaped Loose Delicate joints Emits bad smell Proportionate Lustrous	Stout Large Soft Beautiful Symmetrical Firm Compact Stable Long hands Well developed Low body
temperature			
2. SKIN	Dry Rough Lusterless Blackish	Wrinkles Fair Warts	Oily Soft Glossy Moles Fair Reddish/Yellowish
White/Pinkish		Bluish patches Soft	Glorious
3. EYE	Blackish Dry Lusterless	Reddish/Coppery Small Rounded	White Red/Pink angles Wide and long

	Small Fluctuating Eyelids open While sleeping	Quickly becomes red Sharp eye sight Pleasant Desires cold	Pleasant Oily Calm Gentle look Well designed
white &	Black spheres		
4. EYE BROWS	Unstable Thin Small	Nothing specific	Plenty of hairs Thick
5. EYE LASHES	Small Dry	Thin Few	More Firm Oily
6. HAIRS OF BODY/HEAD MOUSTACHES	Scanty Rough Cracking Lusterless Grayish Curly	Soft Brown/Coppery Small Few Early baldness Early graying	Strong Thick Curly Oily Black Proportionate
7. HEAD	Unstable	Nothing specific	Steady
8. LIPS	Dry Cracking Shapeless Unstable Blackish	Red Colored Soft Thin	Pinkish Smooth Glossy
9. TEETH	Coarse Thin Few Protuberant Cracking Irregular	Medium With gap	Firm Strong Many Healthy gums Even Glazing Straight Smooth Shining White
10. TONGUE	Unstable	Reddish/Coppery	Nothing specific
11. FACE	Rough	Fleshy Worried Look	Pleasant
12. FOREHEAD	Small	With Folds	Large
13. LOWER JAW	Small	Nothing specific	Big
14. JOINTS	Unstable Protuberant Sound Producing on Movements	Loose Moderately hidden	Firm Compact Concealed
15. PALMS	Unstable Dry Rough Cracked	Reddish	Strong Big Oily Firm
16. FOOT	Unstable Rough Cracked	Reddish	Nothing Specific
17. NAILS	Rough Thin	Copper/Reddish Soft	Large Thick

	Small Blackish Cracking Breaking	Small Flat	White Firm Convex Glossy
18. CHEST	Small Not well built	Nothing specific	Big Elevated
19. GAIT	Unsteady Wandering Light Quick Producing Sound Habit of moving hands/legs/shoulder	Fast	Slow Stable Foot pressing against ground
20. ACTIVITIES	Unsteady Quick Starts any work hastily	Unbeatable	Slow Lazy
21. MUSCLES	Bulged calves	Loose/flaccid	Well build
22. STRENGTH exertion	Less Tires Quickly Does not feel tired afterwards	Moderate Cannot withstand physical or mental	Good
23. SPEECH/ VOICE	Talkative Irrelevant Speech Obstructed Hoarse Fast Diffused Speech	Clear Loud Talkative Good and impressive Good at arguments	Gentle Speak less Clear Voice Slow Steady Firm Resonant Voice
24. FOOD HABITS	Eats much Eats swiftly Takes light food Likes hot food Irregular diet habits Irregular digestion Prefers sweet Prefers sour Prefers salty Prefers oily	Excessive hunger Eats much Likes cold/Warm food Eats/Drinks often Prefers bitter Prefers astringent	Likes hot food Dry food Eat slowly Less hungry/thirst Likes spicy Likes bitter Likes astringent Likes sweet Weak in digestion
25. STOOL/ BOWEL formed Once in a day	Hard Bowel Tendency of Constipation	Expels frequently	Yellowish well Large quantity
26. URINE	Obstructed	Yellowish loose Expels frequently Large quantity Yellowish	Nothing specific
27. SWEATING	Noting particular	Sweat very easily Foul smell	Less sweating
28. HUNGER/ THIRST	Unpredictable	Good Cannot tolerate	Less Can tolerate
29. IMMUNITY	Less	Moderate	Good
30. LIFE SPAN	Short	Medium	Long
31. SEXUAL	Less	Medium	More

DESIRE			
32. REPRODUCTIVE regular menstruated	Less Semen	Less inclined to sex	Much Semen/
STRENGTH men	Irregular Menstruation Liked by women/men Poor sexual capacity Un attracted by opposite sex	Less Semen/Ovum	Unlike by women/ Sexually powerful
33. BEHAVIOUR senses	Coward Stealing	Aversion to heat Afraid of discomfort	Stability Control over
	Atheist Unstable No control over sense Quick attachment & detachment	Affectionate to dependence Likes being praised Proud	Grateful Humble Generous Courageous
	Long concealed enmity Noble less Sorrowful Less intelligent Ungrateful Aversion to cold Biting nails Grinding teeth while sleeping	Good behavior Adventurous Jealously Generous Scholar Intelligent	Not greedy Calm Quiet Obedient Straight forward Religious Clean
Honour the teachers			Well educated Civilized Stable
34. FRIENDSHIP	Few Unsteady	Dependable	
35. ANGER	Quick	Quick	Rarely
36. FEAR	Quick	Rarely	Not specific
37. DREAMS Water/Birds/Clouds	Climbing mountains/Sky		Fire/Lightning
38. SLEEP	Interrupted <6 hrs	Sound 6-8 hrs.	Sound 8 <hrs
39. GRASPING POWER Always grasps late but understand best	Quickly/lately	Some times Very clever Genius	Always quickly
40. MEMORY	Forgets quickly	Moderate	Good
41. HOBBIES	Music Humour Hunting Gaming	Fond of garlands Perfumes Decorative Music	Talented
42. INTOLARANCE heat angry. Hunger Thirst, Physical urges	Cold	Hot	Can tolerate cold/
43. PROBLEM right firm quick decision mind FACING	Worrying Constantly	Cannot take stable decision Can take right firm decision	Can take calm and stable

Total number of Characters of Vata	=	133
Total number of Characters of Pitha	=	118
Total number of Characters of Kapha	=	131
Percentage of Characters of one Dosha	=	$\frac{\text{No. of Characters}}{\text{Total No. of Characters}} \times 100$

Prakruthi of the individual

Vata

Pitha

Kapha

Assessment of Dehaprakriti

	Vata	Pitta	Kapha	Vata Pitta	Vata Kapha
	Pitta Kapha	Samadosha			
Twak sara	" Skin only	" Hair deep rooted	"	" Intelligent	
	" Skin smooth	" Hair delicate	"	" Knowledge	
	" Skin soft	" Happy	"	" Good health	
	" Skin clear	" Good fortune	"	" Cheerful	
18. Characters	" Skin lustrous	" Wealthy	"	" Long life	
	" Hair thin	" Joyful	"		
	" Hair small		"		
Raktha Sara	" Ear Unctuous, Reddish , Charming, radiant		"		
" Happy			"		
	" Eyes	"	"	" Mental Power	
	" Face	"	"	" Mental	
	" Tongue	"	"	" Tranquility	
			"	" Lack of	
endurance	" Nose	"	"	"	

Intolerance to heat					"	Delicate
19 Characters strength	"	Lips	"		"	Moderate
	"	Palms	"			
	"	Sole	"			
	"	Nails	"			
	"	Fore head	"			
	"	Palate	"			
	"	Penis	"			
Mamsa Sara depressions in the body	"	Temples Firm, prominent, well covered			"	Free
medium		beautiful			"	Strength
health	"	Nape of neck	"		"	Good
	"	Cheek	"		"	Powerful
	"	Jaws	"		"	Happy
	"	Neck	"		"	Patience
	"	Shoulder	"		"	
Commanding						
greed	"	Abdomen	"		"	Lack of
24 characters	"	Axillae	"		"	Knowledge
	"	Chest	"		"	Long life
	"	Joints	"		"	Simple
	"	Fore head	"		"	Forgiving
	"	Eyes	"			
Meda Sara	"	Much oily skin	"	Glossy teeth	"	Happy
	"	Oily complexion	"	Glossy lips	"	Joyful
	"	Smooth voice	"	Oily urine	"	Charitable
17 Characters	"	Oily eyes	"	Oily stool	"	Simple
	"	Oily hair	"	Wealthy	"	Delicate

	"	Oily nail	"	Powerful	
Asthi Sara	"	Heels prominent/Strong			" Head
prominent/Strong	"	Active			
	"	Ankles	"		" Bone "
	"	Knees	"		" Nails "
" Strong					
	"	Fore arms	"		" Teeth "
" Firm					
15 Characters	"	Collar bone	"		" Enthusiastic
" Long life					
	"	Chin	"		
Majja Sara	"	Softness of organ			" Prominent
long and rounded joints			"	Knowledge	
	"	Strength	"	Long life	" Fertile
	"	Oily complexion	"	Good grasping power	" Honoured
11 Characters	"	Smooth voice			" Wealthy
Sukla Sara	"	Gentle	"	Oily nail	" Wealthy
	"	Gentle look	"	Clear oily complexion	" Healthy
	"	Cheerful	"	Smooth voice	" Powerful
	"	Attractive and colourful skin			" Large buttocks
" Honoured					
	"	Milky eye			
			"	Attracted by opposite sex	" Fertile
20 Characters	"	Teeth, smooth, round firm, ordered, compact, while, pointed			
" Glorious					
			"	Good strength	" Excessive
			"	Happy	Sexual desire
Satva Sara	"	Good memory	"	Skill	" Stable
movement					
					" Intelligent

action	"	Devotion	"	Firm	"	Sincerity in
forward	"	Grateful	"	Courageous	"	Straight
15 Characters	"	Wisdom	"	Devoid of sorrow		
	"	Purity	"	Valor in fighting		
	"	Good enthusiasm				

No. of characters present x 100

Percentage of one Sara =

Total No. of Character of the same

Result

The Sarapareeksha of gives the following grading

Twak Sara	%
Rakta Sare	%
Mamsa Sara	%
Meda Sara	%
Asthi Sara	%
Majja Sara	%
Sukla Sara	%
Satva Sara	%