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Provincial Department of Education - NWP

09 E I

First Term Test - Grade 13 - 2020

Index No : ....

Biology I

Two Hours Only

- Answer all questions.
- Write your Index number in the space provided in the answer sheet.
- When you select the response which you consider to be the best answer to a question mark your response on the answer sheet according to the instructions given in it.

1. To maintain a healthy human body, one should know the causes of the diseases and their effects. Given below are few diseases of humans. Select the correct choice.
   1) Cancers – cannot be identified by the immune system
   2) AIDS – is an autoimmune disease
   3) Kidney failure – wastes and excess fluid is accumulated in the blood
   4) Osteoarthritis – an immunodeficiency disease
   5) Myocardial infarction – due to the degeneration of the nerve tissue

2. Given below is a biochemical reaction that takes place in a living cell.

   Sucrose + H2O $\longrightarrow$ X + Fructose

   Below are some statements that were given by a student regarding it. Select the incorrect one.

   1) This is a condensation reaction
   2) This reaction is catalyzed by the enzyme invertase
   3) X is a hexose
   4) Here, glycosidic bonds are broken
   5) All of the reactants and products of this reaction are water-soluble

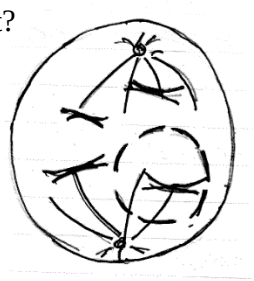
3. Doesn't match with NAD+,
   1) Act as a co-enzyme
   2) Organic cofactor
   3) Got a phosphodiester bond
   4) Has a hexose sugar
   5) Is an oxidizing agent

4. Which of the following statements regarding the preparation of a specimen to be observed under the light microscope cannot be agreed with?
   1) Staining the specimen – for clear observation
   2) Using a mounting medium – to keep the specimen alive
   3) Using a coverslip – to prevent the specimen from being damaged
   4) Using glass slides – for penetration of light
   5) Using a thin specimen – to observe the specimen clearly

5. Given below are some statements regarding the cell wall.
   a. Cell wall materials are produced by the ribosomes
   b. Plasmodesmata of the cell walls connect the cytoplasms of the adjacent cells
   c. Cell wall does not belong to the protoplast
   d. There is a thin layer of pectin just inner to the cell wall

   Which of the above statements true?
   1) a and c 2) b, c, and d 3) b and c
   4) a and c 5) a, b and d

6. Illustrated is a stage of cell division. Which statement is incorrect regarding it?



   1) There are 8 strands of DNA in this cell
   2) The nuclear membrane has not been disintegrated
   3) Condensation of chromosomes is in progress
   4) Chromosomes will arrange on the metaphase plate in the next stage
   5) This could not be a plant cell

7. Select the correct statement regarding cellular respiration.
   1) ATP is produced in the mitochondria only
   2) CO2 is produced in the mitochondria only
   3) FADH2 can be produced outside of the mitochondria
   4) Pyruvate is converted to acetyl CoA outside the mitochondria
   5) At the beginning of Kreb's cycle, dicarboxylic acid is converted to tricarboxylic acid

8. Some instances regarding evolutionary history are given below.
   a. Earliest fossils of the eukaryotes b. Evolution of the first seed plants
   c. Increment of the atmospheric O2 concentration d. Evolution of the genus Homo
   d. Evolution of the dinosaurs

   Select the answer in which the above instances are arranged in the correct order.
   1) A,B,C,D,E 2) B,A,D,E,C 3) C,A,B,E,D
   4) C,A,E,B,D 5) A,C,B,E,D

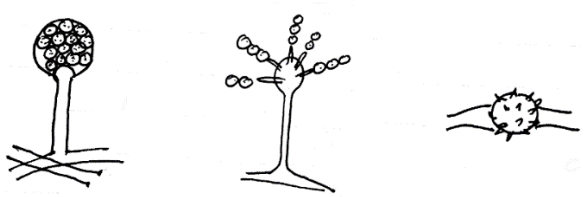
9. Unique to the domain to which *Methanococcus* belongs to,
   1) Starting the synthesis of proteins with methionine
   2) Ability to grow in temperatures above 100oC
   3) Not being sensitive to streptomycin
   4) Being prokaryotic
   5) Having several kinds of RNA polymerases

10. When studying a sample of water from the ocean, a student could identify several species of organisms with the following different morphological features.
   - Having a glass-like wall surrounding the body
   - Unicellular and having a shell with overlapping halves
   - Being golden brown

   Which species/ group display the above features?
   1) Euglena 2) Gelidium 3) Diatom
   3) Paramecium 3)Amoeba

11. Select the answer in which the first phylum to display the relevant feature is not correctly matched.
    1) Heterospory – Lycophyta
    2) Having naked seeds – Cycadophyta
    3) Fertilization of gametes without external water
    4) Photosynthetic gametophyte – Pterophyta
    5) Evolution of flowers – Anthophyta

12. The following structures were found in a kingdom you studied.



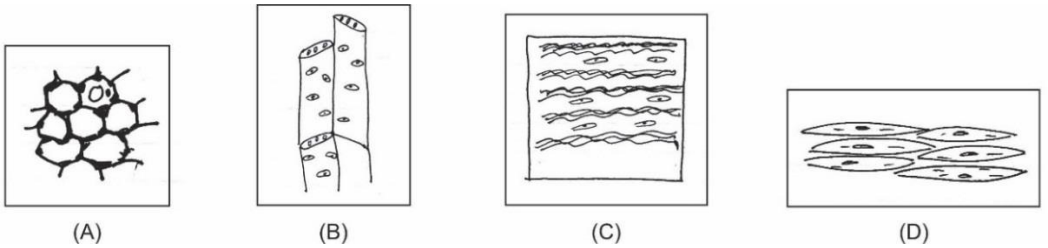
    1) All the three structures A, B, and C involves in sexual reproduction
    2) All the three structures involve in asexual reproduction
    3) A involves in both sexual reproduction and asexual reproduction
    4) C is a metabolically active, multinucleated structure which produces genetically identical spores
    5) All of the spores produced by B are same-aged and genetically identical

13. Which animal uses the muscular diaphragm for the ventilation of the lungs?
    1) Amphibia 2) Chordata 3) Aves
    4) Reptilia 5) Mammalia

14. In animals of which phylum, we can observe the flow of blood to the anterior direction in the dorsal vessels and to the posterior direction in the ventral vessels?
    1) Chordata 2) Echinodermata 3) Annelida
    4) Mollusca 5) Nematoda

15. Can't be agreed regarding the meristematic tissues of the plants,
    1) All the cells resulting from cell division will elongate and differentiate
    2) Meristematic tissues can stay dormant
    3) Some meristematic tissues involve in the regeneration of the broken leaves
    4) Apical meristems are important in the primary growth
    5) Primary meristems are important in the secondary growth of woody plants

16. Given below are some illustrations made by a student while he was observing specimens under the microscope in a practical test.

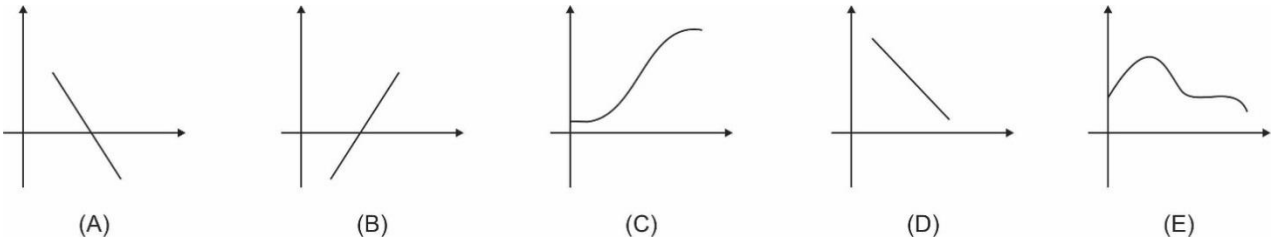


    Another student made some statements on the above illustrations. Select the incorrect one.
    1) A-D are some tissues/cells found in some animals and plants
    2) A is found in tender stems while B is found in all vascular plants
    3) C is found in the tendons of animals
    4) D is involuntarily controlled
    5) Safranin can be used to stain B

17. How the heartwood does differ from the sapwood?
    1) Being located in the periphery of stems and roots of plants
    2) Ability to transport water and minerals
    3) The abundance of tannins, resins, and other organic compounds
    4) Presence of stored food in the cells
    5) Easy invasion by fungi and wood boring insects

18. Environmental factors affect the conduction of water and minerals through the xylem. Reduction of which external environmental factor will increase the conduction of water?
    1) Temperature
    2) CO_2 concentration in the sub stomatal space
    3) Light intensity
    4) Atmospheric humidity
    5) Wind speed

19. Which graph represents the change of angle of curvature at the equilibrium in an experiment to determine the water potential of an Alocasia petiole?



    1) A 2) B 3) C 4) D 5) E

20. Select the anion absorbed by the soil solution, which causes chlorosis in its deficiency?
    6) Mg 2) Mo 3) S 4) Ni 5) Mn

21. Cannot be agreed with the sexual reproduction of land plants,
    1) Sexual organs are covered with sterile filaments
    2) Internal fertilization takes place in all the land plants
    3) Meiosis takes place during gamete formation as well as in spore formation
    4) Fertilization of gametes of seed plants does not need external water
    5) Zygote undergoes mitosis

22. Flowers are developed in the sexual reproduction of angiosperms. Select the true statement regarding the flowers.
    1) A flower always bear microsporophylls and megasporophylls
    2) Bears 4 whorls of modified leaves and all of them are essential
    3) Carpel consists of an anther and a filament
    4) A flower is a specialized shoot
    5) The ovary consists of microsporophylls with stigma and style

23. Forest trees that require relatively high light intensities that live below the canopy display shade avoidance. Select the correct statement regarding this.
    1) Phytochrome receptors provide information on the quality of light to the plant
    2) Red light directs the plant resources to grow tall
    3) Far-red light causes the plant to spend more resources to grow tall
    4) Branching in trees is induced by red light
    5) When plants are directly exposed to sun light far-red : red ratio increases and this causes the plant to grow tall

24. Given below are some statements regarding plant growth substances.
    A. Oxin and cytokinin have opposite effects on apical dominance in plants
    B. Cytokinin and ethylene has opposite effects on leaf senescence
    C. Gibberellins and cytokinins have opposite effects on seed germination

    Which of the above statements are true?

    1) AB 2) AC 3) BC
    3) Only C 5) Only A

25. Which of the following is an adaptation of plants to withstand cold stress?
    1) Lowering the amount of unsaturated fatty acids in the plasma membrane
    2) Increasing the concentration of selected solutes like sugars
    3) Induction of secretion and release of abscisic acid
    4) Decreasing the size of stomata
    5) Bearing thorns and prickles

26. Which of the following is not an adaptation displayed by the bulk feeding animals important for them to tear food or capture prey?

    1) Presence of jaws 2) Presence of teeth 3) Presence of a proboscis
    4) Presence of fangs 5) Presence of claws

27. You have studied the sphincters present in the wall of the gastrointestinal tract of humans. Which of the following is incorrect regarding those sphincters?
    1) Sphincters are present at both proximal and distal ends of the stomach
    2) These sphincters are made by the thickening of circular smooth muscles
    3) Pyloric sphincter regulates the emptying of the stomach content into the duodenum
    4) There are two sphincters between the rectum and the anus
    5) The external anal sphincter is under voluntary control

28. The water-insoluble vitamin acts as an antioxidant is,

    1) Vitamin C 2) Vitamin B12 3) Vitamin D
    2) Vitamin A 5) Vitamin E

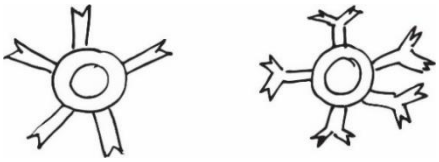
29. Select the most appropriate statement regarding the human heart
    1) Semilunar valves have two flaps
    2) Chordae tendinae are connective tissues
    3) Coronary sinus drains into the left atrium
    4) Chordae tendinae prevents the valves from being turning inside out
    5) Papillary muscles are conical shape protrusions of the wall of the heart

30. Given below is a chart regarding, the ABO blood grouping system.

	Blood Group	Antibody	Antigen
P	A	Anti b	A
Q	B	Anti b	B
R	AB	Anti a, Anti b	-
S	O	Anti a, Anti b	-

    1) All of the P, Q, R, and S are correct 2) Only p and Q are correct
    2) Only p and S are correct 4) Only Q is correct
    5) P, Q, and S are correct

31. Which of the following cannot be agreed regarding the respiration of a healthy adult?
    1) When the person is doing exercises, the limits of the tidal volume increase, and the rate of respiration also increases.
    2) As the alveoli are highly vascularized, a steep gradient of respiratory gasses can be built which facilitates the diffusion of respiratory gasses
    3) Receptors for detecting a drop in the PH value are located only in the medulla oblongata and the wall of the aorta
    4) Breathing can be difficult due to smoking cigarettes
    5) During the ventilation of the person at rest, muscles of the diaphragm, sternum, and most ribs move

32. 

X- Y-

X and Y in the above diagram are two types of cells involved in the human immune system. Given below is a chart made by a student to compare the differences between X and Y. Select the incorrect combination.

	X	**Y**
1	Originates in redbone marrow and maturates in the thymus	Originated and matured in the red bone marrow itself
2	Produces only one type of effector cells	Produces two types of effector cells
3	Recognition takes place only via the antigen fragments presented by the antigen-presenting cells	Recognition happens as the cell directly attaches with the antigen
4	Evoke cell-mediated immune responses	Evoke humoral immune responses
5	Do not produce antibodies	Produce antibodies

33. In artificially acquired passive immunity,
    1) The attenuated pathogen is injected
    2) Produces B and T memory cells
    3) Long-term protection is provided
    4) Cloned antibodies are used
    5) Inactivated toxins from the pathogen are injected

34. An organism with excretory organs which does not release the excretory products directly to the outside environment,
    1) Planaria 2) Earthworm 3) Liver fluke 4) Prawn 5) Cockroach

35. Select the incorrect statement regarding the blood supply to the kidneys
    1) The diameter of the afferent arteriole is greater than the diameter of the efferent arteriole
    2) Efferent arteriole carries blood out of the glomerulus
    3) Some of the peritubular capillaries produce vas- recta along the proximal convoluted tubule
    4) Peritubular capillaries produce the venules
    5) Renal vein transports the nitrogenous waste-free blood away from the kidneys

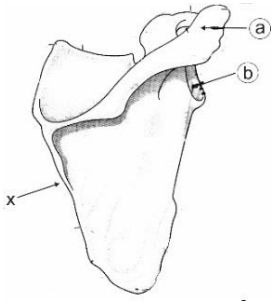
36. Select the mismatching combination regarding the peripheral nervous system of man,
    1) Afferent neurons – carries impulses towards the central nervous system
    2) Autonomic nervous system – coordinates the involuntary processes
    3) Motor nervous system – coordinates voluntary processes
    4) Sympathetic nerves – can be spinal nerves or cranial nerves
    5) Effectors in the parasympathetic system – can be sweat glands, smooth muscles, and cardiac muscles

37. Series of incidents taking place in the homeostasis of the human body is given below,
    a) Increased blood glucose level above normal
    b) The normal blood glucose level
    c) Launching of the mechanisms that reduce the blood glucose levels
    d) Stimulation of the β- cells of the islets of Langerhans of the spleen
    e) Increased production of insulin

1) b,a,d,e,c, 2) b,a,d,e,c,b 3) a,d,e,c,b 4) a,d,e,b,c 5) b,a,e,d,c,b

38. Select the incorrect statement regarding the human female reproductive cycle.
    1) There are two cycles in this as the ovarian cycle and the uterine cycle
    2) It happens every 28 days in all women
    3) Both cycles are controlled by hormones
    4) There are three phases in the menstrual cycle
    5) There are two phases of the uterine cycle parallel to the follicular phase of the ovarian cycle

39. Illustrated in the diagram is a bone of the human skeletal system. Which of the statements given below can't be agreed with it?
    1) It belongs to the appendicular skeleton
    2) a articulates with the clavicle to form the pectoral girdle
    3) b is the glenoid cavity which makes a ball and socket joint with the femur
    4) it is located posteriorly and behind the ribs
    5) Ridge 'X' faces the vertebral column



40. In a plant species Tall [T], red flowers [R], and Green seeds [G] homozygous dominant plant is crossed with a homozygous recessive plant. Three phenotypes were obtained after self-pollinating F1 plants to obtain F2 generation. The number of plants in the F2 generation was 320. Select the correct statement regarding the above cross.
    1) The first cross was a test cross
    2) F1 plants are heterozygous for all the characters
    3) This experiment results comply with the mendelian genetics
    4) The genotypic ratio of RRTTGg in F2 is 1/16
    5) 10 homozygous recessive individuals for all three characters are found in the F2 generation

Use the following chart to answer questions 41-50

Only A, B, D correct	**1**
Only A, C, D correct	**2**
Only A, B correct	**3**
Only C, D correct	**4**
Any other answer /combination of answers correct	**5**

41. Both, membrane-bound enzymes and ribosomes are found in,
    A. Lysosomes B. Smooth endoplasmic reticulum C. Mitochondria
    D. Chloroplasts E. Golgi bodies

42. Select the correct combination/ combinations

	Feature	phylum
A	Closed circulation without a heart	Annelida
B	A single hollow dorsal nerve cord	Arthropoda
C	No clear cephalization, bears sensory papillae	Nematoda
D	Having a muscular foot	Mollusca
E	Endo skeleton with $CaCO_3$ plates	Echinodermata

43. A student after observing a microscopic slide during a practical session mentioned it as a cross-section of monocot root. Which of the following characters could help him identify that specimen?
    A. Having a broad cortex just inner to the epidermis
    B. Having a well distinguishable pith
    C. Having a star-shaped xylem
    D. Xylem and phloem arranged alternatively in a circle
    E. Presence of a layer of collenchyma just inner to the epidermis

44. Select the correct statement/ statements regarding the thalamus of humans
    A. Located within the cerebral hemispheres
    B. Located bilateral to the third ventricle
    C. Arranged in two masses with only grey matter
    D. Relays the impulses from the cerebrum to the relevant effector organ
    E. Hypothalamus is located just above it

45. Select the correct statement/ statements,
    A. Both radius and ulna articulate with carpals
    B. Tarsals and carpals are equal in number
    C. Radius and ulna are parallel during supination
    D. Palm is made with 19 bones
    E. Thumb is essential during power grip as well as in the precision grip

46. Results due to the overactive thyroid,
    A. Increased basal metabolic rate B. Dry skin C. Warm sweaty skin
    D. Diarrhea E. Constipation

47. Reasons for selecting a garden pea plant for genetic experiments,
    A. Short life cycle
    B. The ability to self-pollinate only
    C. Having a large number of contrasting traits
    D. Production of a large number of offspring in one generation
    E. The inability to cross-pollinate

48. What is/are true regarding the inflammatory reactions of man?
    A. Part of the specific immune system
    B. Histamine is a signaling molecule important in inflammation
    C. The signaling molecule cytokine is released by the eosinophils
    D. A mild infection causes a localized inflammation
    E. Blood pressure is increased during an inflammatory response

49. Similarities between phylum Lycophyta and phylum Pterophyta,
    A. Sporophyte being the dominant plant
    B. Bears macrophylls
    C. The ability of the gametophyte to be photosynthetic
    D. Having flagellated sperm
    E. All members being homosporous

50. Function/ functions of carotenoid pigments,
    A. Absorption of light waves of a specific wavelength
    B. Photoprotection
    C. Being present in the reaction center of photosystems
    D. Providing color to some of the plant parts
    E. Direct participation in the light reactions

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Provincial Department of Education - NWP

09	E	I

First Term Test - Grade 13 - 2020

Index No : .....

Biology II

Three Hours Only

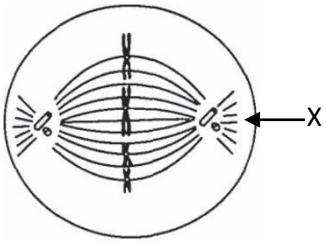
Impotent

Part A - Structured Essay. Answer all questions on the paper itself.

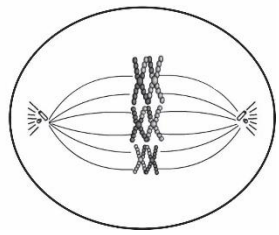
Part B - Essay, Answer four questions only. Give clearly labled diagrams where necessary.

Part A - Structured Essay

01). A). Answer all questions.



A



B

i. a. State the cell division types shown by above diagrams.

A.....

B.....

b. What is the stage spent by the cell in the above divisional types.?

A.....

B.....

c. Write a difference of chromosomes between stages A and B

.....

.....

ii. What is labelled as X in the above diagram. Write the importance of it.

X -.....

.....

iii. What is the difference in cytoplasmic division of plant cells and animal cells?

Plant cells .....

Animal cells .....

iv. Draw a labelled diagram of the organelle contribute for the cytoplasmic division of higher plant cells.

B). i. Write 2 adaptations of plant leaf to capture light efficiently in Photosynthesis.

.....

.....

ii. What are the products of linear electron flow of photosynthesis?

.....

iii. What is photo protection ?. State its importance.

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iv. Name the three steps of Calvin cycle of photosynthesis.

.....

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.....

C). i. What are plant growth regulators ?

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.....

ii. Name hormones contribute for following functions.

a. functions in phototropism and gravitropism

.....

b. Promote ripening of many types of fruits

.....

c. Promote stomata closure during drought stress.

.....

d. Stimulate pollen tube growth

.....

e. Promote horizontal growth.

.....

f. Promote movement of nutrients into sink tissues.

.....

g. Promotes flowering in the pineapple family.

.....

02). A). i. What is evolution ?.

.....

.....

ii. What are the criteria used in five kingdom system ?.

.....

.....

iii. Name the three domains and state the initiator amino acid for protein synthesis in each domain

Domain	Amino acid
.....	.....
.....	.....
.....	.....

iv. Name the only gymnosperm phylum which have vessels in xylem.

.....

B). i. Name the animal phylum which belong diploblastic animals.

.....

ii. State the organization of nervous system of above animal phylum.

.....

.....

iii. a. Name the systems involved in coordination of organisms.

.....

.....

b. State four differences between above systems related to coordination.

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iv. What is nerve impulse ?.

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.....

v. State two factors depend on speed of conduction of nerve impulse along a axon.

.....

.....

vi. What is a sensory receptor.

.....

C). i. Name the three major types of skeletons in animal kingdom & state a animal phylum for each type.

Type of skeleton	Animal phylum
.....	.....
.....	.....
.....	.....

ii. State common functions of the skeletal system in animals.

.....

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iii. Write the main types of joints in the human skeletal system

.....

.....

.....

iv. State the characteristic features of muscle cells.

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.....

03). A). Following questions ((i) – (vii)) are based on the laboratory experiment that conduct for the determination of solute potential of *Tradescantia (Rhoeo)* cepidermal tissue.

i. Write two reasons for using Rhoeo lower epidermal tissues without using lower epidermal tissues of grass leaves.

.....

.....

ii. What is the reasons for putting several (2-3) tissues into an one solution?

.....

.....

iii. Why does, the large volume (20ml) of solution is used comparatively to the tissue?

.....

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iv. Write the procedure of preparation of slides using the above tissues in three steps.

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v. Name the axis of the graph that is drawn based on the readings of the experiment.

X .....

Y .....

vi. What is the point of the graph which can be used to determine the solute potential?

.....

.....

vii. How do you find the solute potential of the tissue from the above readings?

.....

.....

viii. When comparing the solute potential of the tissue of *colocasia* petiole, which tissue shows the highest value? explain the reason.

.....

.....

B). i. What is meant by a plant meristem?

.....

.....

ii. Write four common characteristic features of meristamtic cells.

.....

.....

.....

iii. Name three main types of plant meristamatic tissues and write a function that perform by each tissue?

Meristem	Function
.....	.....
.....	.....
.....	.....

iv. Write two differences between a shoot apex and a root apex

Shoot apex	Root apex
.....	.....
.....	.....
.....	.....

C). i. What is meant by sexual reproduction?

.....

.....

ii. What is "parthenogenesis" of animals?

.....

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iii. Write a main function of each of the following structures which are related to the human reproductive system.

a. Leydig cells .....

b. Epididymis .....

c. Acrosome of sperm .....

d. Bulbourethral gland .....

iv. Mention the time period that can be taken to occur fertilization from the ovulation

.....

.....

v. Name the place where natural fertilization takes place in the reproductive system.

.....

.....

vi. Write the time taken for implantation after the fertilization.

.....

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vii. Name a local regulator that contribute to the contraction of uterus.

.....

.....

viii. Write a main hormone which affects the synthesis of milk.

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04). A). i. Write specific characteristics of the Human respiratory surface.

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ii. Name the types of cells of human respiratory surface.

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iii. Mention two types of muscles that contribute for ventilation of lungs

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iv. Name two types of additional muscles involve during exercise.

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v. Name two components of cigarette smoke.

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vi. Name the respiratory disorder which leads pulmonary hypertension and Heart attack.

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B). i. Write three components of a nucleotide

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.....

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ii. Name two types of pentose sugars consist of a nucleotides.

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iii. Nucleic acids are formed by the collection of serval millions of nucleotides. Explain the condensation reaction of the above function.

.....

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iv. Write the differences between RNA and DNA

.....

.....

C). i. Name the era/eon that relevant to the following incidences in the evolution.

a. Cone-bearing plants dominated .....
b. first seed plants appeared .....
c. flowering plants appeared .....
d. Diversification of early vascular plants .....
e. Amphibians dominated .....
f. Marine algae becomes abundant .....
g. Concentration of atmospheric oxygen begins to increase .....
h. Divers algae and soft bodied invertebrates animals appeared .....
i. Origin of mammals .....
j. Colonization of land by divers fungi, plants and Animals .....

ii. What are the main parts of conducing system of the Heart?

.....

.....

.....

iii. Name the place of the heart where the above (ii) parts are located.

.....

.....

iv. Name two hormones affect for the rate of the Heartbeat

.....

.....

First term test - 2020

Grade 13 - Biology - II

Part B Essay

❖ **Answer only four Questions.**

05). Explain the energy relationships of metabolic processes in living being.

06). a. Describe the gross structure of the Human small intestine and explain the process of protein digestion in the small intestine.

b. Describe the regulation of digestion in man

07). a. briefly explain the mechanism that based on the Homeostatic control systems of the human body.

b. Explain the Homeostatic regulation of body temperature in humans.

08). a. Explain the gross primary structure of dicotyledonous plant root.

b. Explain the way of occurring upward movement of water and minerals in a plant by relevant mechanisms.

09). a. Describe the gross structure of human kidney.

b. Describe the process of urine formation.

10). Write short notes on

a. Properties of water due to H-bonds

b. Cold stresses

c. Allergies

Grade 13 - First Term Test 2020
Biology
Marking Scheme

Part I

(1) - 3	(11) - 4	(21) - 3	(31) - 3	(41) - 4
(2) - 1	(12) - 3	(22) - 4	(32) - 2	(42) - 5
(3) - 4	(13) - 5	(23) - 2	(33) - 4	(43) - 1
(4) - 2	(14) - 3	(24) - 5	(34) - 5	(44) - 3
(5) - 3	(15) - 1	(25) - 2	(35) - 3	(45) - 4
(6) - 2	(16) - 2	(26) - 3	(36) - 4	(46) - 2
(7) - 5	(17) - 3	(27) - 2	(37) - 2	(47) - 2
(8) - 3	(18) - 4	(28) - 5	(38) - 2	(48) - 5
(9) - 2	(19) - 2	(29) - 5	(39) - 3	(49) - 2
(10) - 3	(20) - 2	(30) - 3	(40) - 5	(50) - 1

Structured Essay

(1) (A) (i) a) A - Mitotic division
B - me

b) A - Metaphase
B - metaphase.

c) A - Chromosomes are located as a single line in metaphase plate.

B - ~~homolog are~~ pair of homologous chromosomes get arranged on the metaphase plate

(ii) X - Centrosomes.
formation of spindle and aster in cytoplasm.

(iii) ~~Explain the difference of cytoplasmic cell division in plant cells and animal cell.~~

- In plant cells, cell plate is formed
- In animal cells a cleavage furrow is formed.

(iv) diagram of golgi bodies

These papers were printed, packed and distributed under the strict sanitary regulations approved by the Ministry of Health.

(B) I. Dorsoventrally flat.
- Variation in branching pattern.
- being thin leaves.
- Palisade parenchyma cells with chloroplast locate closed to the upper epidermis
- Transmission of chloroplast presence of light.

II. ATP
NADPH
O_2

III. Absorption and dissipation of excessive light energy.
- excessive light interact with oxygen and form reactive oxidative molecules which damage to the cell.

(IV). carboxylation.
- Reduction
- Regeneration of carbondioxide acceptor.

(C) (i). Produce in small quantities.
- get transported from the place they are produced to other parts of the organism
- trigger responses in target cells
- effect on plant growth and development
- signaling molecules.

(1) • auxins
• cytokinin
• abscisic acid
• ethylene
• gibberlin.

(11) a- Auxin.
b) Ethylene
c)- Abscisic acid
d)- Gibbereline
e) Ethylene.

(2) (A) (i) Ability of organisms to change over time as a result of genetic modification.

(ii) 1 Nature of cellular organization.
2 Unicellular or multicellular and ~~mode of~~
3 ~~nutrition~~ mode of nutrition.

(iii) Domain
Bacteria.
Archea.
Eukarya

amino acid
Formyl methylene.
Methionine
methionine.

(iv) Gnetophyta.

(B) (i) Cnidaria.
(ii) nerve net
(iii) a) nervous system
Endocrine system

(b)

nervous coordination	hormonal coordination.
1. transmit through neurons	1. transmit through blood.
2. chemical and electrical transmission.	2. chemical transmission.
3. localized response.	3. diffused response.
4. duration of response short	4. duration of response long.
5. fast acting action	5. Slower action.

(iv) Series of action potentials that move along an axon

(v) 1. diameter of axon
2. myelinated axon.

(vi) Specialized structure which can detect a specific stimulus.

(c)(i)

type of skeleton	animal phylum
1. hydrostatic skeleton	Annelida/Nematoda.
2 exoskeleton	Arthropoda / Mollusca
3 Endoskeleton	Echinodermata/ Chordata

(ii) • Support
• Protection.
• Movement

(iii). Ball and socket joints
• Hinge joints
• Pivot "

(iv). • excitability / irritability • contractility
• extensibility • elasticity.

Structured essay

(3) A. Following questions (i) - (viii) are based on the laboratory experiment that conduct for the determination of solut potential of Tradescantia (Rhoeo) epidermal tissue.

(i) Write two reasons for ~~the~~ using ~~of~~ Rhoeo lower epidermal tisseues without using ~~of~~ lower epidermal tissues of grass leaves.

1. • Colourful sap / pigments in Rhoeo.
2. • epidermal tissue can remove easily.

(ii) What is the reason for putting several (2-3) tissues into an one solution?

- to reduce the number of tures of experiment that occur.

(iii) Why does, the large volume (20 ml) of solution is used comparatively to the tissues?

- to minimize the change of concentration of solution due to absorption of water by epidermal tissues.

(iv) Write the procedure of preperation of slides using the above tissues ~~by~~ as three steps.

1. Place a drop of the solution on ~~the~~ slide.
2. Mount the tissue on the slide using a brush / inoculation needle.
3. close with a cover-slip & observe under a microscope.

(v) Name the axis of the graph that is drawn based on the readings of the experiment.

X - Molarity of the solution.

Y - Percentage of plasmolized cells

(vi) What is the point of the graph can use to determine the solute potential?

- Molarity that has 50% of plasmolised cells.

(vii) How do you find the solute potential of the tissue from the above readings?

- from the relevet data table.

(viii) What is the tissue that shows highest value when compair the solute potential of the tissue of Colocasia pitiole? explain the reason.

- in Colocasia pitiole.
- it grows near water bodies, therefore
- it's cells contand high amount of water/ less solute concentration.

B. (i) What is meant by a plant meristem?

- undifferentiated tissue / cells.
- constantly divide under suitable condition
- & produce new cells

(ii) Write four common characteristic features of meristamatic cells.

1. -all are living cells.
2. -dense cytoplasm
3. -ability to multiply
4. -roughly sperical / isodiametric / ....

(iii) Name three main types of plant ~~meristems~~ meristamatic tissues and write a function that perform by each tissue.

Meristem	function
1. apical meristem	• increase the length of plant parts
2. lateral meristem	• increase the circumference of stem / root of woody plants
3. intercalary meristem	

(iv) Write two differences between a shoot apex and a root apex.

Shoot apex	Root apex
1. covered by premodial leaves	• covered by root cap
2. produces new cells only inwards	• produce new cells both outwards & inwards

C. (i) What is meant by a sexual reproduction?

- the process of development of a new offspring by diploid zygot
- that produced by the fertilization of haploid gamets of two parents.

(ii) What is 'parthenogenisis' of animals?

- Development of a new organism without fertilization of an egg.

(iii) Write a main function of each of the following mentioned structures which are regarded with the human reproductive system.

a) Leydig cells – • secretion of testosteron / Androgen
b) Epididymis – • storage of matured sperms
c) Acrosome of sperm – • degeneration of outer layer of the ovum
d) Bulbourethral gland – • secretion of (Clear) Alkaly solution

(iv) Mention the time duration period that can be taken to occure fertilization from the Ovulation.

- 12 – 24 hours

(v) Name the place where natural fertilization takes place in the reproductive system.
- In the upper reaches of the uri-duct.

(vi) Write the time taken to implantation, after the fertilization.
- 7 days.

(vii) Name a local regulator that contribute to the contraction of Uterus.
- Prostaglandins

(viii) Write a main hormone that affect for the synthesis of Milk.
- Prolactin.

(4) A. (i) Write specific characteristics of the Human respiratory surface.
- It should be moist & permeable to gasses.
- It must be thin surface / membrane.
- It should posses large surface area.
- It should posses a good blood supply.

(ii) Name the types of cells of human respiratory surface.
- simple squamous epithelium.
- Macrophages.
- Surfactant cells.

(iii) Mention two types of muscles that contribute for ventilation of lungs.
- neck muscles
- back / Chest muscles.

(iv) Name two components of cigeret smoke.
- Nicotin
- Hydrogen cyanide / carbon monoxide.

(vi) Name the respiratory disorder which leads pulmonery hypertension and Heart attack

- Silicosis.

B. (i) Write three components of a nucleotide

- Pentose sugar
- Nitrogenous base
- Phosphate group.

(ii) Name two types of pentose sugar consist of a nucleotides

- Deoxyribose.
- Ribose.

(iii) Collection of several millions of nucleotides to form nucleic acids. explain the condensation reaction of the above formation.

- Condensation between the -OH group of ~~the~~ Phosphate of one nucleotide
- with H attached to 3rd carbon of pentose sugar of the other nucleotide
- to form phosphate-di-ester bond.

(iv) Write differences between RNA and DNA.

- DNA double stranded
  RNA Single stranded.
- DNA contains A, T, C, G but not U.
- RNA contains A, U, C, G but not T.

DNA - Deoxyriboa Sug.
RNA - Ribose sugar.

C (i) Name the relevant era / eon of that relevent to the following incidences in the evolution.

a) Cone-bearing plants dominated - Mesozoic
b) first seed plants appeared - Palaeozoic
c) flowering plants appeared - Mesozoic
d) Diversification of early vascular plants - Palaeozoic
e) Amphibians dominated - Palaeozoic
f) Marine algae becomes abundant - Palaeozoic
g) Concentration of atmospheric oxygen begins to increase - Archaean eon
h) Divers algae and soft-bodied invertibrates animals appeared - Proterozoic eon
i) Origin of Mammals - Mesozoic
j) Colonization of Land by divers fungi, Plants and Animals - Palaeozoic

(ii) What are the main parts consists of Conducting system of the Heart ?

- SA node
- AV node
- Atrioventricular bundle (bundle of His) bundle of branches and purkinje fibers.

(iii) Name the place of the Heart where the above (ii) parts are located.

- in the myocardium.

(iv) Name two hormones affect for the rate of the Heart beat.

- Adrenalin
- Thyroxin

Essay - Biology Grade (13)
1st term test.

(05) Explain the energy relationships in metabolic processes in living being.

1. Sum of all biochemical reactions of living being is known as the metabolism.
2. It consists of two as catabolic
3. and anabolic reactions.
4. in catabolism, break down of complex molecules into simple molecules by releasing free energy.
5. it is an ~~endergonic~~ exergonic reaction.
6. in anabolism, make complex molecules from the simple molecules by absorbing free energy.
7. it is an endergonic reaction.
8. reactions that caused by the absorption of energy released ~~by from~~ by catabolic reactions in living system are called anabolic reactions.
9. ATP act as the energy carrier in living organisms including the simplest bacteria./
10. ATP is the universal currency of energy transactions.
10. Energy can be defined as the capacity do work.
11. living organisms require energy for their living processes.
12. Eg - Synthesis of substances.
13. Eg - active transport across plasma membrane.
14. Eg - transmission of nerve impulses.
15. Eg - Muscle contraction / beating of cilia & flagella / Bioluminescence / electrical discharges.

the energy relationships of living system on biosphere is composed of,

16. energy flows into biologyeal systems from the environment through solar radiation.
17. light is captured ~~by~~ in the cells having photosyn-thetic pigments by the process of photosynthesis & stored as chemical energy in the organic compounds like carbohydrates.
18. captured energy in organic food is transformed into chemical energy in ~~the~~ ATP by a process of cellular respiration.
19. the energy stored in ATP is utilized in various energy requiring processes.
20. hydrolysis of ATP produce ADP & Pi
21. as a result, a very high energy is released.
22. because the reactent / ATP & water contain more energy in comparison to products / ADP & Pi.
23. therefor it released energy & is an exergonic reaction.
24. the free energy released of each of the two end phosphate group is -30.5 kJ/mol, when ATP is hydrolized.
25. most biologyeal reactions use the energy released during breaking of the terminal phosphate bond.
26. ATP is mobile.
27. it can carry anywhere in the cell, for any energy consuming reaction.
28. ATP can be produced within the living cells within the short period of time using ADP, Pi & energy.
29. Production of ATP within cell is phosphorylation
30. according to the energy source phosphorylation is divide ~~into~~ as three groups.

31. Photophosphorylation, ATP synthesis using solar energy in photosynthesis.
32. Substrate phosphorylation, Synthesis of ATP using energy released by the breaking down of complex molecule into simple molecule.
33. Oxydative phosphorylation, Synthesis of ATP using energy released as a result of oxidation of molecules.
34. In living cells energy in ATP is transformed into various energy forms which are used for different functions.
35. ½ - Electricity, Uses in conveying electrical impulses.
36. ½ - Mechanical, Uses in muscles contraction.
37. ½ - Chemical energy, Uses in synthesis of various compounds.
38. ½ - Heat, Uses in maintaining body temperature.
39. ½ - light, Uses in bioluminescence.

any 38 x 4 = 150

06 a.) Describe the gross structure of the Human small intestine and explain the process of protein digestion in the small intestine.

b) Describe the regulation of digestion in man.

a) 1. longest organ in the alementary canal.
2. devide into three regions.
3. duodenum
4. jejunum.
5. ileum.
6. duodenum is C shaped curve.
7. locate around the head of the pancreas.
8. jejunum is the middle part.
9. Ileum is the terminal part.
10. inner surface of the small intestine passes parmanent circular folds.
11. folds contain villi
12. increase greatly increase the surface area of by this folds & villi.
13. epithelial cells that cover the villi posses micro vill.
14. villi have good blood supply.

Protein digestion.

15. acidic chyme that enter to the duodenum is nutralized by bicorbonate in the pancreatic juce.
16. Small polypeptides in the chyme, are converted into smaller polypeptide within the duodenum.
17. it is stimulated by trypsin & Chymotrypsin in the pancreatic juce.
18. Smaller polypeptides convert into small peptide within the duodenum.
19. it is stimulated by carboxypeptidases in the pancreas
20 small peptides convert into Amino acids.
21 It is stimulated by dipeptidases / carboxy peptidase) amino peptidases,
22 that secreted by the intestinal epithelium.

b) 1. regulate by two ways.

2. nervous regulation &
3. endocrine regulation
4. nervous regulation mainly by nervous reflexes.
5. eg- nervous regulate stimulate the release of saliva when food reach the mouth.
6. endocrine system plays a critical role in digestion in the stomach & small intestine.
7. when food arrives the stomach, it's wall is streched
8. & ~~release~~ ~~gastrin~~ ~~juice~~ triggers to release hormone gastrin
9. gastrin stimulates the production of gastric juice at the stomach.
10. & stimulate the peristalsis of the stomach.
11. & chyme enter to the duodenum.
12. Secretin &
13. Cholecystokinin/cck ~~from~~ secrete from the duodenum.
14. cck triggers release of bile from the gall bladder.
15. & digestive enzymes from the pancreas.
16. Secretin stimulate the release of bicarbonate from the pancreas.

17. when the chyme is rich in fat,
18. increas the level of secretin & cck.
19. therefor exhibit the peristalsis &
20. gastric juice secretion from the stomach.
21. slows down the digestion of food in the stomach & emptying by the stomach.

any (18)

A - 20
B - 18
} 38 x 4 = (150)

(07) a) Breifly explain the mechinism that based on the Homeostatic control systems of the Humen body.

b) Explain the Homeostatic regulation of body temperature of Humans.

a) 1. Homeostasis is a steady state where body's internal environment remains relatively constant within narrow physiologycal limits despite significant changes in the external environment.

2. Homeostasis control systems in the human body mainly depend on negative feedback mechanisms.

3. it maintains a constant level to prevent serious Changes in the internal environment.

4. Homeostasis is achieved by maintaining a variable at or near a particular value.

5. eg - body temperature.
blood glucose.
blood pH
blood osmolality
} any (2).

7. a fluctuation in the variable above or below the set point serves as the stimulus.

8. these stimulus detected by a sensor / detector.

9. when a signal is received from the sensor, a control center generates output.

10. it triggers a response. by a response.

11. return the variable towards the set point level.

12. set point level is achieved by the negative feedback control of the stimulus by the response.

b) 1. normal body temperature of man is typically 37°C (36.5°C – 37.5°C)
2. control by negative feedback mechanism.
3. a group of nerve cely in the hypothalamus of the brain functions as a thermostat.
4. high peripheral temperature / when a person is in hot surrounding is detected by warmth receptors on the skin.
5. nerve impulses are sent to the body's control temperature control center. in the hypothalamus.
6. on respense to the increas on body temperature above the present level, the 'thermostat' in the hypothalamus sends impulses to activate heat loss mechanisms.
7. to exhibit heat gain mechenisms...
8. dilation of blood vessles in the skin which causes filling of blood capilaries with warm blood.
9. radiating heat from the ~~blood~~ skin surface.
10. increase sweat secretion from the sweat glands
11. promotes heat dissipation throug evaporative cooling.
12. When body temperature is within the normal range, again, the warm temperature sensitive receptors are no longer stimulated.
13. their signals to the hypothalamic thermostat stops due to negative feedback mechanism.
14. then additional heat loss mechanisms stop.
15. low pheripharal temperature / when in cold surrounding is detected by cold receptors on the skin.
16. low deep body temperature is detected by temperature sensitive nerve endings in the hypothalamus.

17. these nerve impulses are sent to the body's temperature control center / thermostat in the hypothalamus.
18. if the body temperature decreases below the present level, the thermostat in hypothalamus sends impulses to activate heat gain mechanisms & inhibit the heat loss mechanisms.
19. construction of blood vessles in the skin which divert the blood from the skin to deeper tissues.
20. thereby reducing ~~the~~ heat loss through the skin surface.
21. rapid repetitive contraction of skeletal muscles / shivering to generate heat.
22. contracting hair erector muscles to genetate heat to some extent.
23. stimulating secretions of more thyroxin
24. and adrenalin
25. it increases the metabolic rate & cellular metabolism to produce more heat.
26. when body temperature returns to the normal range, the cold temperature sensitive recoptors are no longer stimulated.
27. their signals to the hypothalamic thermostat stop due to negative feedback mechanism.
28. additional heat generating mechanisms in the body stop.
29. blood flow to the ~~pheripheral~~ pheripheries returns normal.

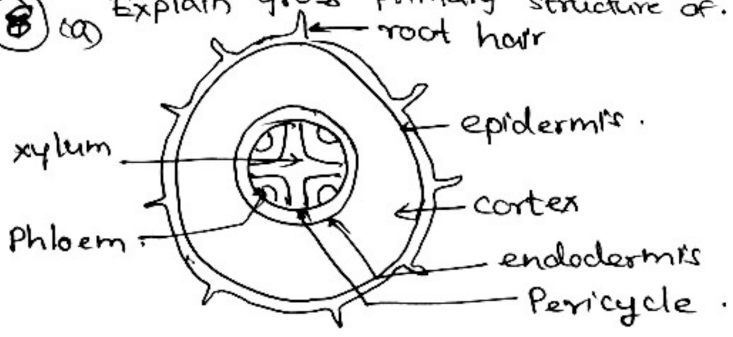
any (26)

12 + 26 ⟶ 38

38 × 4 = (150)

Answers of essay questions.

(8) (a) Explain gross primary structure of dicot plant root.



1. Outermost cell layer is epidermis.
2. Epidermis cells have outgrowths called root hairs
3. Inner to it / between epidermis and vascular cylinder, there is cortex
4. It is made up of parenchyma cells with intercellular spaces.
5. Innermost layer of cortex is endodermis.
6. cortex is a single cell layer.
7. Interior to endodermis there is pericycle
8. Containing 2/3 parenchyma cell layers.
9. Star shaped xylum can be found in the middle
10. Phloem is located in the groove between the arms of xylum.
11. Cambium is present between xylum and phloem.

(b) Explain the way of upward movement of water and minerals in a plant using relavent mechanisms.

1. Water and minerals which enter to Vascular cylinder are transported to upper parts of the plant is called ascent of xylum sap.
2. To explain this proces cohesion- tension hypothesis is put ferward.

3. As water evaporates from the ~~mes~~ stomata,
4 water potential of mesophyll cells reduces.
5. water moves from cells of petioles to the mesophyll cells.
6. It creates a pull in xylum of leaves, petiole and stem.
7. It reduces the water potential of cells of petiole
8. Water Potential gradient within xylum is essentially a pressure gradient ($\psi_s + \psi_{st} + \psi_p$)
9. Transmit this pull along the entire length of xylem from leaves to root through shoot
10. due to cohesion of water molecules.
11. So xylum sap is normally under tension
12. The negative pressure potential help water to more up through xylum and water moves
13 according to the water potential gradient
14. transport water by bulk flow.
15 Adhesion and
16. Cohesion facilitate this transport.
17. Due to high adhesion water molecules are attracted to cellulose molecules in xylum walls
18.
19. Due to cohesion forces among water molecules a continuous water column is formed within xylum vessels and tracheids.
20. Transpiration pull extend from leaves to root.
21. Tensile force on xylum sap is transmitted from leaves to soil through root and stem.

(22) Water potential gradient · is present from soil solution to atmosphere through plant body.

(23) It help ascent of xylem sap, against the gravity.

(24) It is a passive proces. | no spending metabolic energy.

(9) a) Describe the gross structure of human kidney

1. Kidney is a bean shaped organ.
2. which is surrounded by a fibrous connective tissue.
3. consist of two kidneys.
4. In the longitudinal section of the kidney three tissue areas of tissues can be seen to the naked eye.
5. Outer most layer is fibrous capsule / renal capsule.
6. Inner to capsule, renal cortex is located.
7. Inner to cortex renal medulla is located;
8. Medulla is composed of renal pyramids.
9. pyramids take a striated appearance.
10. Apices of pyramids project in to renal pelvis through renal papillae.
11. Cortex and medulla are supplied with blood vessels and tightly packed with excretory tubules.

12. Renal cortex is granulated due to the presence of glomeruli.

13. Cortex and medulla are supplied with blood vessels and tightly packed with excretory tubules

14.

Describe the process of urine formation.

1. There are 3 processes involved in urine formation.
2. ultrafiltration.
3. Selective reabsorption.
4. Secretion.
5. Filtration of blood under high pressure into the cavity of the Bowmans capsule is called ultrafiltration
6. Filtrate in Bowman's capsule is called glomerular filtrate.
7. Blood cells, platelets, plasma proteins do not contain in the filtrate.
8. Filtrate in the Bowman's capsule contain water
9. salts
10. amino acids, glucose, vitamins
11. nitrogenous waste.
12. In selective reabsorption, useful molecules
13. ions and water from the glomerular filtrate are returned to interstitial fluid.

13. Then absorb in to capillary network of the tubules

14. When glomerulus filtrate pass through proximal convoluted tubule

15. glucose and amino acids are actively transported

16. Na^+ actively transport

17. K^+, HCO_3^- Cl^- passively transport.

18. H_2O is reabsorbed passively by osmosis

19. In descending limb of loop of Henle water reabsorb passively through osmosis

20. In ascending limb of loop of Henle

21. Most of the Na^+ is transport by active transport.

22. Considerable amount of NaCl reabsorption occur.

23. No water absorption take place and filtrate become more diluted.

24. In distal convoluted tubule.

25 Na^+ and actively transport and HCO_3 passively transport.

26. water reabsorption occur passively with presence of ADH

27. In collecting duct water reabsorption occur presence of ADH.

28. Na^+ reabsorb actively.

29. The process by which foreign materials and substances not required to the body are cleared from peritubular capillaries and Interstial fluid in to filtrate is Secretion.

30 In proximal convoluted tubule H^+ is secreted actively.

31. NH_3 passively secreted.

32. In distal convoluted tubule K^+ and H^+ actively secreted

33. At the end filtrate pass along the collecting duct become concentrated and form urine.

(10) Write short notes on

(a) Properties of water due to H-bonds.

1. Arraction between water molecules due to hydrogen bonding
2. is called cohesion
3. Arraction between water molecules and other substances
4. are known as adhesion.
5. Both of these properties, water act as a transport medium.
6. Due to cohesion between water molecules, water and dissolved substances such as
7. transport through xylum and
8. phloem against gravity.
9. Adhesion between water molecules and cell walls also helps in conduction of water and dissolved substances.
10. Water has high surface tension.
11. This ability is given to water molecules due to cohesion between water molecules.
12. Therefore in an aquatic system, upper surface water molecules are attracted by lower surface molecules and forms a water film.
13. Water molecules surround each of the solute molecules and form H-bonds with them.
14. Therefore water act as a solvent.

(b) Cold stress.

1. When cell membrane cools below a critical temperature it looses its fluidity
2. due to lipids become locked into crystaline structure.
3. It blocks the transport across the membra and affects the function of the cell.
4. Plants respond to cold stress by increasing the proportion of unsaturated fatty acids
5. Which keeps the membranes more fluid at law temperature.
6. Freezing is another cold stress.
7. Before the onset of winter, the cell of frost-tolerant plants
8. increase cytoplasmic levels of specific solutes such as sugars
9. that help to reduce the loss of water from the cell
10. preventing dehydration.

(c) Allergies.

1. Some persons are overly reactive to substances and antigens that induce hypersensitive reactions in some persons are called allergens.
2. Exaggerated responses of the body to certain antigens are called allergies.
3. Common allergens include pollens / dust /
4. Some food (any 2)
4. Some antibiotics / (any 2)
5. Venom from honey bees and wasps.
6. Whenever an allergic reaction take place the tissue injury occurs.
7. The most allergens stimulate production of plasma cells
8. which secrete antibodies specific for the antigen.
9. When the same allergen enter the body later, it become attach to the antibodies specific to the allergen.
10. which induce the mast cells to release histamin and other inflammatory chemicals.
11. Acting on a variety of cell types these signals bring about typical allergy symptoms.
12. such as sneezing
13. runny nose
14. teary eyes / breathing difficulties (any 3)
15. An acute allergic conditions sometimes lead to death of the person within few seconds of exposure to an allergen.

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