WARNING :	Any malpractice or any attempt to commit any kind of malpractice in the Examination will DISQUALIFY THE CANDIDATE.	
PAPER – II BIOLOGY		
Version Code	**Question Booklet Serial Number**	
Time : 150 Minutes	**Number of Questions : 120**	**Maximum Marks : 480**
Name of Candidate		
Roll Number		
Signature of Candidate		

INSTRUCTIONS TO THE CANDIDATE

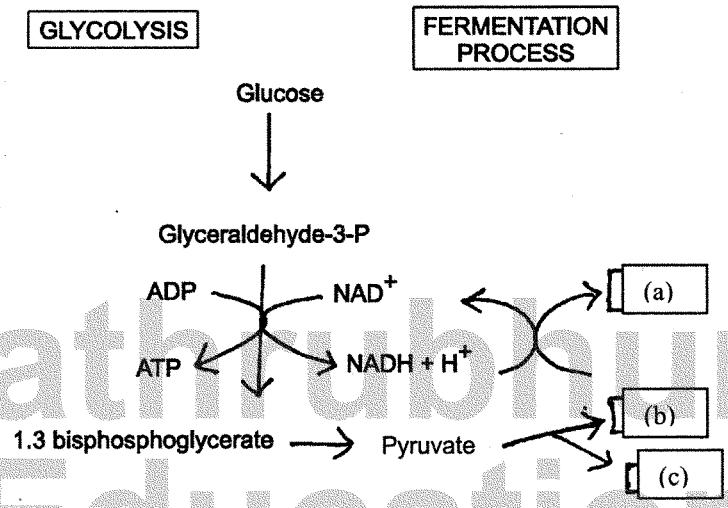
1. Please ensure that the **VERSION CODE shown at the top of this Question Booklet is the same as that shown in the OMR Answer Sheet issued to you.** If you have received a Question Booklet with a different **VERSION CODE**, please get it replaced with a Question Booklet with the same VERSION CODE as that of the OMR Answer Sheet from the Invigilator. **THIS IS VERY IMPORTANT.**
2. Please fill in the items such as name, signature and roll number of the candidate in the columns given above. Please also write the Question Booklet Sl. No. given at the top of this page against item 4 in the OMR Answer Sheet.
3. Please read the instructions given in the OMR Answer Sheet for marking answers. Candidates are advised to strictly follow the instructions contained in the OMR Answer Sheet.
4. This Question Booklet contains 120 Questions. For each Question, five answers are suggested and given against (A), (B), (C), (D) and (E) of which, only one will be the **Most Appropriate Answer**. Mark the bubble containing the letter corresponding to the 'Most Appropriate Answer' in the OMR Answer Sheet, by using either **Blue or Black ball - point pen only.**
5. Negative Marking: In order to discourage wild guessing, the score will be subject to penalization formula based on the number of right answers actually marked and the number of wrong answers marked. Each correct answer will be awarded FOUR marks. One mark will be deducted for each incorrect answer. More than one answer marked against a question will be deemed as incorrect answer and will be negatively marked.

IMMEDIATELY AFTER OPENING THIS QUESTION BOOKLET, THE CANDIDATE SHOULD VERIFY WHETHER THE QUESTION BOOKLET ISSUED CONTAINS ALL THE 120 QUESTIONS IN SERIAL ORDER. IF NOT, REQUEST FOR REPLACEMENT.

DO NOT OPEN THE SEAL UNTIL THE INVIGILATOR ASKS YOU TO DO SO

PLEASE ENSURE THAT THIS BOOKLET CONTAINS 120 QUESTIONS SERIALLY NUMBERED FROM 1 TO 120 (Printed Pages : 32)

1. Choose the correct combination of labelling the molecules involved in the pathway of anaerobic respiration in yeast

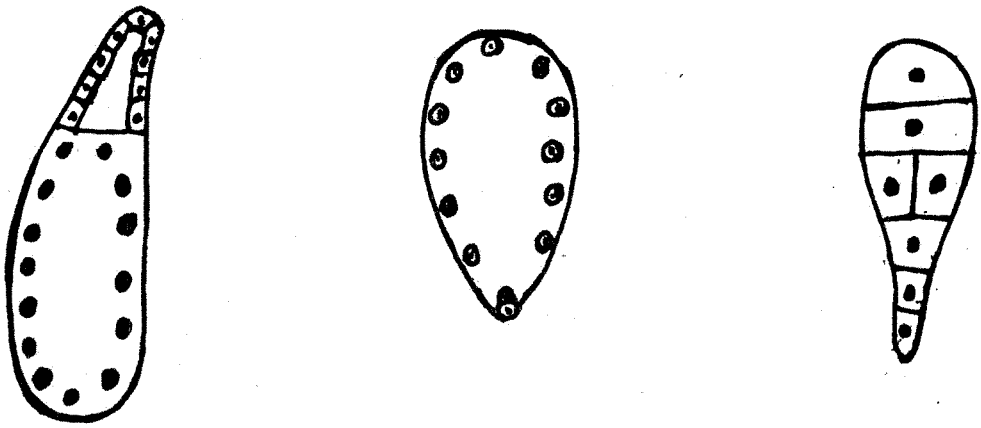


(A) (a) Ethanol (b) CO_2 (c) Acetaldehyde
(B) (a) CO_2 (b) Ethanol (c) Acetaldehyde
(C) (a) CO_2 (b) Acetaldehyde (c) Ethanol
(D) (a) Acetaldehyde (b) CO_2 (c) Ethanol
(E) (a) Ethanol (b) Acetaldehyde (c) CO_2

2. In which of the following reaction of glycolysis, a molecule of water is removed from the substrate?

(A) Fructose-6-phosphate → Fructose 1,6-bisphosphate
(B) 3-phosphate glyceraldehyde → 1,3 bisphosphoglyceric acid
(C) PEP → Pyruvic acid
(D) 2-phosphoglycerate → PEP
(E) Glucose → glucose 6-phosphate

3. Select the correct order of endosperm types



(A) Cellular, helobial, free nuclear
(B) Cellular, free nuclear, helobial
(C) Helobial, free nuclear, cellular
(D) Free nuclear, cellular, helobial
(E) Free nuclear, helobial, cellular

4. Choose the mis-matched option

(A) Wind	-*Cannabis*	-	Anemophily
(B) Water	-*Zoostera*	-	Hydrophily
(C) Insects	-*Salvia*	-	Entomophily
(D) Birds	-*Adansonia*	-	Ornithophily
(E) Bats	-*Kigelia*	-	Chiropterophily

5. One hormone helps in ripening of fruits while the other stimulates closure of stomata. These are respectively

(A) Abscisic acid and auxin
(B) Ethylene and abscisic acid
(C) Abscisic acid and ethylene
(D) Ethylene and gibberellic acid
(E) Gibberellic acid and abscisic acid

6. Pick out the correct statements

(a) Cytokinins specially help in delaying senescence
(b) Auxins are involved in regulating apical dominance
(c) Ethylene is especially useful in enhancing seed germination
(d) Gibberellins are responsible for immature falling of leaves

(A) (a) and (c) only
(B) (a) and (d) only
(C) (b) and (c) only
(D) (a) and (b) only
(E) (b) and (d) only

7. Match List I and List II and select the correct option

List I	List II
a. Auxin	1. Herring sperm DNA
b. Cytokinin	2. Inhibitor of growth
c. Gibberellin	3. Apical dominance
d. Ethylene	4. Epinasty
e. Abscisic acid	5. Induces amylase synthesis

(A) a-3, b-1, c-5, d-4, e-2
(B) a-4, b-5, c-1, d-3, e-2
(C) a-2, b-1, c-5, d-3, e-4
(D) a-3, b-1, c-5, d-2, e-4
(E) a-4, b-1, c-5, d-3, e-2

8. Match the Column I with Column II and select the correct option

Column I	Column II
a) Camouflage	1) Dendrobates pumilio
b) Batesian mimicry	2) Horse-shoe bat
c) Warning colouration	3) Monarch butterfly
d) Echo location	4) Praying mantis

(A) a - 2, b - 4, c - 3, d - 1
(B) a - 3, b - 4, c - 2, d - 1
(C) a - 4, b - 1, c - 3, d - 2
(D) a - 4, b - 3, c - 1, d - 2
(E) a - 3, b - 4, c - 1, d - 2

9. Match the following with correct combination

	Column I		Column II
(a)	Mutualism	(i)	Tiger and Deer
(b)	Commensalism	(ii)	Cuscuta on Cissus
(c)	Parasitism	(iii)	Sucker fish and Shark
(d)	Predation	(iv)	Crab and Sea anemone

(A) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)
(B) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)
(C) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)
(D) (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)
(E) (a) - (iv), (b) - (ii), (c) - (iii), (d) - (i)

10. The change in population size at a given time interval t, is given by the expression
$N_t = N_o + B + I - D - E$
I, B and D stand respectively for
(A) Rate of immigration, mortality rate, natality rate
(B) Rate of emigration, natality rate, mortality rate
(C) Mortality rate, natality rate, rate of immigration
(D) Mortality rate, rate of immigration, natality rate
(E) Rate of immigration, natality rate, mortality rate

11. The amount of freshwater of the earth frozen as polar or glacial ice is
(A) 0.5% (B) 0.02% (C) 0.01%
(D) 1.97% (E) 2.5%

12. Which one of the following is considered as pioneer community in xerarch?
(A) Annual herb (B) Perennial herb (C) Scrub stage
(D) Forest stage (E) Lichen

13. Mercury pollution causes
(A) Black foot disease
(B) Itai-itai disease
(C) Blue-baby syndrome
(D) Minamata disease
(E) Skeletal fluorosis

14. Which of the following is not properly matched ?

(A) Formaldehyde – Carcinogenic
(B) Sulphur dioxide – Respiratory problems
(C) Nitrogen oxide – Brown air
(D) Photochemical smog – Grey air
(E) Mean annual temperature of earth – 25°C

15. Match Column I (Indian forest types) with Column II (Dominant tree genera) and choose the correct option

Column I	Column II
a. Tropical rain forest	1. Hopea
b. Tropical deciduous forest	2. Shorea
c. Temperate broad leaf forest	3. Quercus
d. Temperate coniferous forest	4. Picea

(A) a – 1, b – 2, c – 3, d – 4
(B) a – 2, b – 1, c – 4, d – 3
(C) a – 3, b – 2, c – 1, d – 4
(D) a – 1, b – 2, c – 4, d – 3
(E) a – 4, b – 3, c – 2, d – 1

16. Gaseous pollutants can be controlled by

(A) Arrestors
(B) Electrostatic precipitators
(C) Pyrolysis
(D) Incineration
(E) Adsorption

17. It is estimated that out of the total global warming the relative contribution of CO_2, CH_4, CFCs and N_2O are found respectively as

(A) 60%, 20%, 14% and 6%
(B) 6%, 14%, 20% and 60%
(C) 20%, 60%, 14% and 6%
(D) 20%, 14%, 60% and 6%
(E) 14%, 6%, 20% and 60%

18. In the table given below, some of the crop plants, their diseases and the pathogens are given. Match these three columns and identify the correct choice

CROP	DISEASE	PATHOGEN
a) Pigeon pea	I) Root knot	1) Pseudomonas
b) Brinjal	II) Earcockle	2) Fusarium
c) Sugarcane	III) Wilt	3) Anguina
d) Wheat	IV) Red stripe	4) Meloidogyne

(A) a-III-2, b-I-4, c-IV-1, d-II-3
(B) a-I-2, b-III-4, c-II-3, d-IV-1
(C) a-IV-3, b-I-2, c-III-1, d-II-4
(D) a-II-1, b-IV-3, c-I-2, d-III-4
(E) a-III-4, b-II-1, c-IV-3, d-I-2

19. Which of the following promotes softening of fruits?

(A) Polygalacturonase
(B) Colchicine
(C) Polyethylene glycol
(D) Cellulase
(E) Brazzein

20. Select the wrong statement

(A) Pectinase and cellulase dissolve the cell wall
(B) Some *Cyanobacteria* form symbiotic association with the fern *Azolla*
(C) Regeneration of cell wall in somatic hybridisation is induced by PEG
(D) Plants obtained through pollen culture are always haploids
(E) Shoot regeneration in callus is promoted by cytokinin like BAP

21. Match the names of the scientists with their contributions and choose the correct answer

Name of the scientist	Contributions
a. Walter Sutton	1. Discovered penicillin
b. Stanley Cohen	2. Discovered double helical structure of DNA
c. Alexander Flemming	3. Discovered the chromosomal basis of heredity
d. James D. Watson	4. Discovered r-DNA

(A) a-2, b-1, c-4, d-3
(B) a-3, b-4, c-1, d-2
(C) a-1, b-3, c-2, d-4
(D) a-4, b-3, c-2, d-1
(E) a-3, b-1, c-4, d-2

22. The amount of usable energy which is available for doing work when the temperature and pressure are uniform throughout the system is called

(A) Enthalpy (B) Activation energy
(C) Spontaneous energy (D) Free energy
(E) Entropy

23. New Systematics introduced by Sir Julian Huxley is also called

(A) Phenetics (B) Cladistics (C) Biosystematics
(D) Numerical Taxonomy (E) Chemotaxonomy

24. Match the following and choose the correct combination from the options given

	Column I (Group Protista)		Column II (Example)
(a)	Chrysophytes	(i)	Paramoecium
(b)	Dinoflagellates	(ii)	Euglena
(c)	Euglenoids	(iii)	Gonyaulax
(d)	Protozoans	(iv)	Diatoms

(A) (a) – (i), (b) – (iii), (c) – (ii), (d) – (iv)
(B) (a) – (i), (b) – (iv), (c) – (iii), (d) – (ii)
(C) (a) – (iv), (b) – (ii), (c) – (iii), (d) – (i)
(D) (a) – (iii), (b) – (iv), (c) – (i), (d) – (ii)
(E) (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

25. Consider the following statements regarding the major pigments and stored food in the different groups of algae and select the correct options given

(a) In Chlorophyceae the stored food material is starch and the major pigments are chlorophyll-a and d

(b) In Phaeophyceae, laminarin is the stored food and major pigments are chlorophyll-a and b

(c) In Rhodophyceae, floridean starch is the stored food and the major pigments are chlorophyll- a, d and phycoerythrin

(A) (a) is correct, but (b) and (c) are wrong

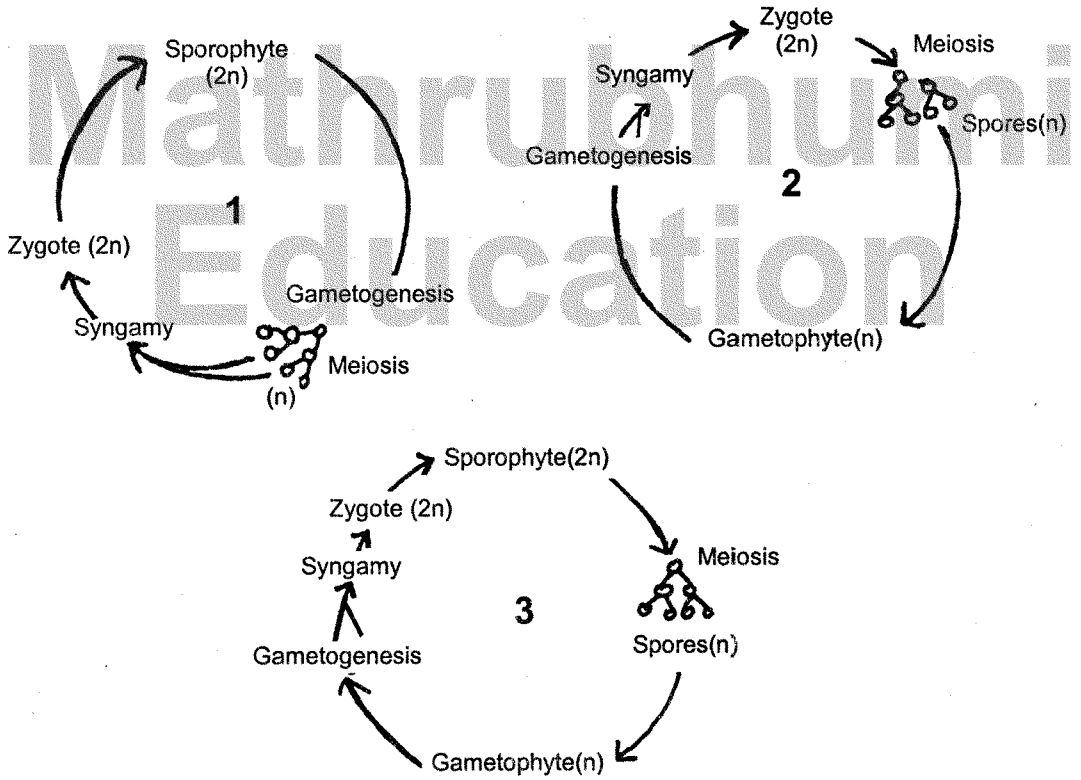
(B) (a) and (b) are correct, but (c) is wrong

(C) (a) and (c) are correct, but (b) is wrong

(D) (b) is correct, but (a) and (c) are wrong

(E) (c) is correct, but (a) and (b) are wrong

26. Which of the following correctly represents the type of life cycle patterns from the options given?



(A)	1. Diplontic	2. Haplodiplontic	3. Haplontic
(B)	1. Haplodiplontic	2. Haplontic	3. Diplontic
(C)	1. Haplontic	2. Diplontic	3. Haplodiplontic
(D)	1. Diplontic	2. Haplontic	3. Haplodiplontic
(E)	1. Haplontic	2. Haplodiplontic	3. Diplontic

27. Choose the wrong pair

(A) Hepaticopsida - *Marchantia*
(B) Lycopsida - *Selaginella*
(C) Bryopsida - *Anthoceros*
(D) Pteropsida - *Dryopteris*
(E) Sphenopsida - *Equisetum*

28. Which of the following is a merit in the Bentham and Hooker's system of classification?

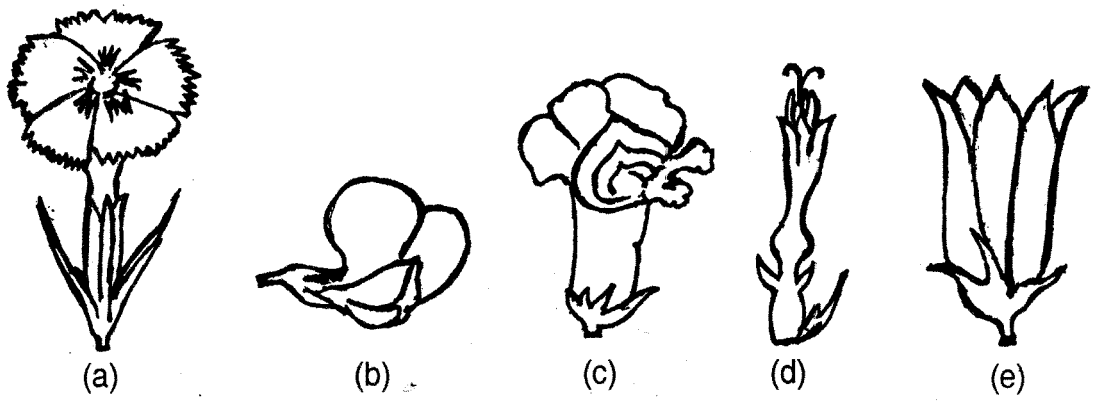
(A) The position of Gymnospermae in between dicots and monocots
(B) Closely related families are placed apart
(C) The placement of family Asteraceae in the beginning of gamopetalae
(D) The placement of order Ranales in the beginning
(E) The placement of Orchidaceae in microspermae

29. Match the following with correct combination

Column I	Column II
a. *Cuscuta*	1. Saprophyte
b. *Eichornia*	2. Pneumatophore
c. *Monotropa*	3. Insectivorous plant
d. *Rhizophora*	4. Parasite
e. *Utricularia*	5. Root pocket

(A) a-4, b-3, c-1, d-5, e-2
(B) a-4, b-5, c-1, d-2, e-3
(C) a-2, b-3, c-1, d-5, e-4
(D) a-3, b-1, c-5, d-4, e-2
(E) a-2, b-5, c-4, d-3, e-1

30.



The correct sequence of types of corolla in the figure given above is

(A) (a) caryophyllaceous (b) papilionaceous (c) bilabiate (d) tubular (e) bell-shaped

(B) (a) papilionaceous (b) bilabiate (c) tubular (d) bell-shaped (e) caryophyllaceous

(C) (a) bilabiate (b) papilionaceous (c) caryophyllaceous (d) bell-shaped (e) tubular

(D) (a) caryophyllaceous (b) bilabiate (c) papilionaceous (d) tubular (e) bell-shaped

(E) (a) tubular (b) bell-shaped (c) caryophyllaceous (d) bilabiate (e) papilionaceous

31. Which of the following statements is / are true?

a. If the stem is jointed with solid nodes and hollow internodes, it is called caudex

b. In *Tridax* the stem is decumbent

c. Corm is a condensed form of rhizome growing more or less in vertical direction

d. Sucker is an underground modification of stem

e. Biparous type of cymose branching is seen in *Saraca*

(A) a, d and e only (B) b and c only (C) b, c and e only

(D) c and d only (E) d and e only

32. In the monocotyledonous seeds the endosperm is separated from the embryo by a distinct layer known as

(A) Testa (B) Aleurone layer (C) Tegmen

(D) Scutellum (E) Coleoptile

33. Match List I with List II and select the correct option

List I	List II
a. Spike	1. *Bougainvillea*
b. *Capitulum*	2. *Coleus*
c. *Dichasial cyme*	3. *Adhatoda*
d. *Multiparous cyme*	4. *Zinnia*
e. *Verticillaster*	5. *Asclepias*

(A) a-3, b-4, c-1, d-5, e-2
(B) a-3, b-1, c-4, d-5, e-2
(C) a-2, b-4, c-1, d-5, e-3
(D) a-4, b-2, c-5, d-1, e-3
(E) a-5, b-4, c-1, d-3, e-2

34. Which of the following represents the floral characters of *Liliaceae*?

(A) Six tepals, zygomorphic, six stamens, bilocular ovary, axile placentation
(B) Tetramerous, actinomorphic, polyphyllous, unilocular ovary, axile placentation
(C) Trimerous, actinomorphic, polyandrous, superior ovary, axile placentation
(D) Bisexual, zygomorphic, gamophyllous, inferior ovary, marginal placentation
(E) Unisexual, actinomorphic, trilocular, inferior ovary, axile placentation

35. The botanical name of soyabean is

(A) *Cajanus cajan* (B) *Glycine max* (C) *Glycyrrhiza glabra*
(D) *Abrus precatorius* (E) *Dolichos lablab*

36. Which of the following is / are not characteristic features of *Asteraceae* ?

a. Cypsela type of fruit
b. Syngenesious stamens
c. Ovary bicarpellary and superior
d. Placentation marginal
e. Head type of inflorescence

(A) (b), (c) and (d) only (B) (c) and (e) only (C) (c) and (d) only
(D) (a) and (b) only (E) (c) only

37. Family Podostemaceae is placed under the Series

(A) Multiovulatae aquaticae
(B) Microembryeae
(C) Daphnales
(D) Unisexuales
(E) Heteromerae

38. Match the items in Column I with Column II and choose the correct answer

Column I	Column II
a. *Artemisia* sp	1. Insecticide
b. *Solidago* sp	2. Santonin
c. *Eclipta alba*	3. Dropsy
d. *Chrysanthemum roseum*	4. Tonic in spleen enlargement

(A) a-2, b-3, c-4, d-1
(B) a-1, b-2, c-3, d-4
(C) a-3, b-4, c-2, d-1
(D) a-4, b-3, c-2, d-1
(E) a-3, b-1, c-4, d-2

39. Which of the following statements is / are true?

(a) Uneven thickening of cell wall is characteristic of sclerenchyma
(b) Periblem forms the cortex of the stem and the root
(c) Tracheids are the chief water transporting elements in gymnosperms
(d) Companion cell is devoid of nucleus at maturity
(e) The commercial cork is obtained from *Quercus suber*

(A) (a) and (d) only (B) (b) and (e) only (C) (c) and (d) only
(D) (a), (b) and (c) only (E) (b), (c) and (e) only

40. The waxy material deposited in the casparian strip of the endodermis is

(A) Pectin (B) Suberin (C) Cellulose
(D) Lignin (E) Hemicellulose

41. The vascular cambial ring of a dicot stem is

(A) Primary in origin
(B) Secondary in origin
(C) Embryonic in origin
(D) Tertiary in origin
(E) Partly primary and partly secondary in origin

42. Consider the following statements

a) In a dicot root, the vascular bundles are collateral and endarch

b) The inner most layer of cortex in a dicot root is endodermis

c) In a dicot root, the phloem masses are separated from the xylem by parenchymatous cells that are known as the conjunctive tissue

Of these statements given above

(A) (a) is true; but (b) and (c) are false

(B) (b) is true; but (a) and (c) are false

(C) (a) is false; but (b) and (c) are true

(D) (c) is false; but (a) and (c) are true

(E) (c) is true; but (a) and (b) are false

43. Which of the following statements is / are true ?

(a) The resolution power of unaided human eye is 100 micrometre

(b) The highest resolution is obtained with the light of shortest wavelength

(c) Dark field microscope is most useful for viewing the living cells

(d) Chromatography is the method of separation of molecular components of the cells present in cytosol

(e) In gel filtration chromatography, molecules can be separated in picogram to nanogram quantities

(A) (a), (c) and (d) only (B) (b) and (d) only (C) (c) and (e) only

(D) (c), (d) and (e) only (E) (a), (b) and (d) only

44. The method developed by Matthew Meselson and Franklin Stahl to separate heavy DNA with ^{15}N from DNA with ^{14}N, for providing evidence for semi-conservative replication of DNA is

(A) Ion exchange chromatography

(B) Density gradient centrifugation

(C) Buoyant density centrifugation

(D) Gel filtration

(E) Isopycnic centrifugation

45. Which one of the following is not characteristic of gram-positive bacteria?

(A) Cell wall is smooth

(B) Mesosomes are distinctively prominent

(C) Basal body of flagellum contains 2 rings

(D) Outer membrane is present

(E) Murein content of cell wall is 70 -80%

46. Match the following with correct combination

Column I	Column II
a. Endoplasmic reticulum	1. Stack of cisternae
b. Spherosome	2. Store oils or fats
c. Dictyosomes	3. Synthesis and storage of lipids
d. Peroxisome	4. Photorespiration
e. Elaioplasts	5. Detoxification of drugs

(A) a-5, b-3, c-1, d-4, e-2
(B) a-5, b-3, c-2, d-4, e-1
(C) a-2, b-3, c-1, d-4, e-5
(D) a-4, b-3, c-1, d-5, e-2
(E) a-3, b-5, c-1, d-4, e-2

47. Read the following statements and identify the correct options given

(a) Sap vacuoles – contain digestive enzymes with the help of which nutrients are digested
(b) Contractile vacuoles – take part in osmoregulation and excretion
(c) Food vacuoles – store and concentrate mineral salts as well as nutrients
(d) Air vaculoes – store metabolic gases and help in buoyancy of cells

(A) (a) and (b) are correct (B) (a) and (c) are correct
(C) (a) and (d) are correct (D) (b) and (d) are correct
(E) (b) and (c) are correct

48. Pathogenicity of bacteria causing tuberculosis and leprosy is due to

(A) Cholesterol (B) Ergosterol (C) Prostaglandins
(D) Glycerol (E) Wax-D

49. Which of the following statements is / are not true ?

a) Glycerol is a 3 carbon alcohol with 3 OH groups that serve as binding sites
b) Waxes are esters formed between a long chain alcohol and saturated fatty acids
c) The term protein was coined by Gerardus Johannes Mulder
d) Agar is an indispensable polysaccharide and it is a complex polymer of glucose and sulphur-containing carbohydrates

(A) (a) and (c) only (B) (a) and (d) only (C) (a), (b) and (d) only
(D) (a), (c) and (d) only (E) (d) only

50. An example of feedback inhibition is

(A) Cyanide action on cytochrome

(B) Sulpha drug on folic acid synthesizer bacteria

(C) Allosteric inhibition of hexokinase by glucose 6-phosphate

(D) Reaction between succinic dehydrogenase and succinate

(E) The inhibition of succinic dehydrogenase by malonate

51. Pick out the correct statements

(a) Mitosis takes place in the somatic cells and meiosis takes place in the germ cells

(b) During mitosis, the DNA replicates once for one cell division and in meiosis the DNA replicates twice for two cell divisions

(c) Mitosis and meiosis occur both in sexually and asexually reproducing organisms

(A) (a) only (B) (b) only (C) (c) only

(D) (a) and (b) only (E) (b) and (c) only

52. Path of water movement from soil to xylem is

(A) Soil → Root hair → Cortex → Pericycle → Endodermis → Metaxylem → Protoxylem

(B) Soil → Root hair→ Cortex → Endoderms → Pericycle → Protoxylem → Metaxylem

(C) Soil → Root hair → Epidermis → Endodermis → Phloem → Xylem

(D) Soil → Root hair → Epidermis → Cortex → Phloem → Xylem

(E) Soil → Root hair → Cortex → Protoxylem → Phloem → Metaxylem

53. Which of the following statements is / are not true ?

(a) In CAM plants stomata open during dark and remain closed during the day

(b) Role of Na^+ in stomatal opening is now universally accepted

(c) The water potential of root cells is higher than the water potential of soil

(d) Capillarity theory is the most accepted theory of water movement through plants

(e) The walls of xylem vessels made up of ligno-cellulose have strong affinity for water molecules

(A) (b), (c) and (e) only

(B) (b), (c) and (d) only

(C) (a), (b) and (c) only

(D) (b) and (c) only

(E) (a) and (e) only

54. Match the following mineral element with their deficiency symptom and choose the correct option

Column I	Column II
a) Calcium	1) Chlorotic veins
b) Potassium	2) Delayed germination of seeds
c) Zinc	3) Necrosis of young leaves
d) Iron	4) Scorched leaf tips
e) Phosphorous	5) Malformed leaves

(A) a – 3, b – 1, c – 5, d – 2, e – 4
(B) a – 1, b – 4, c – 5, d – 3, e – 2
(C) a – 3, b – 4, c – 5, d – 1, e – 2
(D) a – 2, b – 3, c – 4, d – 1, e – 5
(E) a – 4, b – 2, c – 1, d – 3, e – 5

55. Which of the following three organelles are involved in photorespiration?

(A) Chloroplast, Mitochondrion, Glyoxysome
(B) Chloroplast, Peroxisome, Mitochondrion
(C) Chloroplast, Lysosome, Peroxisome
(D) Chloroplast, Lysosome, Glyoxysome
(E) Chloroplast, Glyoxysome, Mitochondrion

56. Consider the following statements

a) The portion of the spectrum between 500 nm and 800 nm is also referred to as photosynthetically active radiation (PAR)
b) Magnesium, calcium and chloride ions play prominent roles in the photolysis of water
c) In cyclic photophosphorylation, oxygen is not released (as there is no photolysis of water) and NADPH is also not produced

Of these statements given above

(A) (a) is true; but (b) and (c) are false
(B) (a) and (b) are false; but (c) is true
(C) (b) is true; but (a) and (c) are false
(D) (a) and (b) are true; but (c) is false
(E) (a) and (c) are true; but (b) is false

57. Which of the following statements with regard to photosynthesis is / are correct?

(a) In C4 plants, the primary CO_2 acceptor is PEP
(b) In the photosynthetic process PS II absorbs energy at or just below 680 nm
(c) The pigment that is present in the pigment system I is P_{683}

(A) (b) and (c) only (B) (a) only (C) (c) only
(D) (a) and (b) only (E) (a) and (c) only

58. Consider the following statements regarding photosynthesis

(a) ATP formation during photosynthesis is termed as photophosphorylation

(b) Kranz anatomy pertains to leaf

(c) Reduction of $NADP^+$ to NADPH occurs during Calvin cycle

(d) In a chlorophyll molecule magnesium is present in phytol tail

Of the above statements

(A) (a) and (b) are correct

(B) (c) and (d) are correct

(C) (a) and (c) are correct

(D) (a) and (d) are correct

(E) (b) and (c) are correct

59. If R.Q. is less than 1.0 in a respiratory metabolism, it would mean that

(A) Carbohydrates are used as respiratory substrate

(B) Organic acids are used as respiratory substrate

(C) The oxidation of the respiratory substrate consumed more oxygen than the amount of CO_2 released

(D) The oxidation of the respiratory substrate consumed less oxygen than the amount of CO_2 released

(E) The reaction is anaerobic

60. Match the number of carbon atoms given in List I with that of the compounds given in List II and select the correct option

List I	List II
a) 4.C. Compound	1) Acetyl-CoA
b) 2.C. Compound	2) Pyruvate
c) 5.C. Compound	3) Citric acid
d) 3.C. Compound	4) α-ketoglutaric acid
	5) Malic acid

(A) a - 2, b - 5, c - 3, d - 1

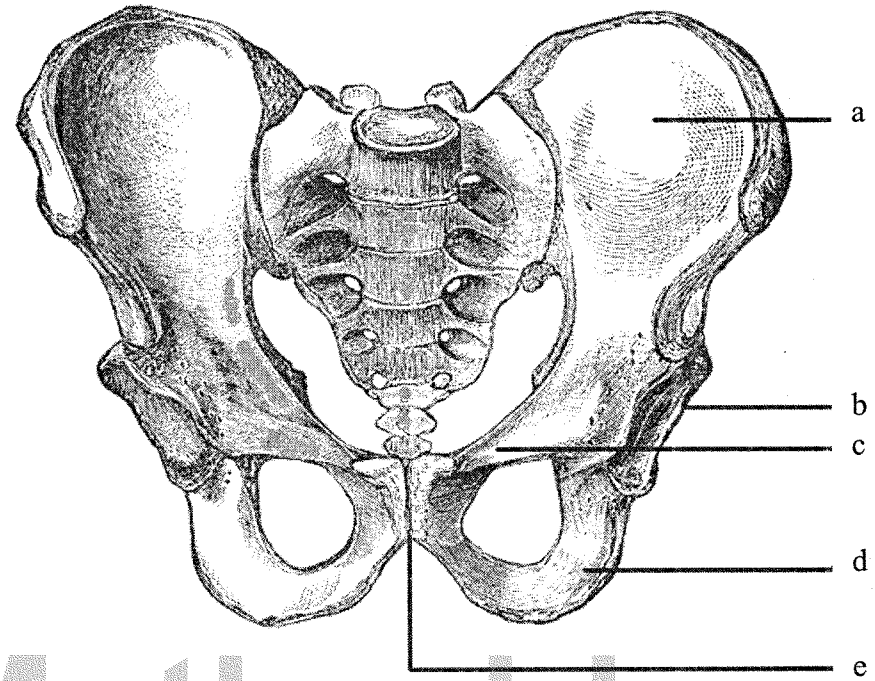
(B) a - 3, b - 1, c - 4, d - 2

(C) a - 5, b - 1, c - 4, d - 2

(D) a - 5, b - 3, c - 1, d - 2

(E) a - 3, b - 4, c - 1, d – 5

61. In the pelvic girdle of man a, b, c, d and e respectively represents



(A) a- pubis b- acetabulum c- ilium d- ischium e- pubic symphysis

(B) a- ilium b- acetabulum c- pubis d- ischium e- pubic symphysis

(C) a- ischium b- acetabulum c- pubis d- ilium e- pubic symphysis

(D) a- ilium b- pubis c- acetabulum d- pubic symphysis e- ischium

(E) a- ilium b- acetabulum c- pubic symphysis d- ischium e- pubis

62. Proximal convoluted tubule (PCT) is lined with

(A) cuboidal epithelium

(B) simple brush border epithelium

(C) simple cuboidal brush border epithelium

(D) simple ciliated brush border epithelium

(E) columnar epithelium

63. Match List I with List II and select the correct option

List I	List II
a. adrenalin	1. myxoedema
b. hyperparathyroidism	2. accelerates heart beat
c. oxytocin	3. salt-water balance
d. hypothyroidism	4. childbirth
e. aldosterone	5. demineralisation

(A) a-2, b-5, c-4, d-1, e-3
(B) a-3, b-4, c-5, d-3, e-2
(C) a-5, b-3, c-2, d-4, e-1
(D) a-2, b-3, c-4, d-5, e-1
(E) a-5, b-3, c-4, d-2, e-1

64. Which of the following animal is unisexual?
(A) Tapeworm
(B) Leech
(C) Sponge
(D) Earthworm
(E) Cockroach

65. In a myelinated neuron, two adjacent myelin sheaths are separated by gaps called
(A) nodes of Ranvier
(B) synaptic cleft
(C) schwann cells
(D) synaptic knob
(E) neural plate

66. Fovea in the eye is a central pit in the yellowish pigmented spot called
(A) blind spot
(B) retina
(C) cornea
(D) macula lutea
(E) choroid

67. The potential maintained across the neuron membrane during the resting state is
(A) +70 mV
(B) –70 mV
(C) 0.5 V
(D) –30 mV
(E) +30 mV

68. Match List I with List II and select the correct option

List I	List II
a) Sacral nerves	1) 1 pair
b) Thoracic nerves	2) 8 pairs
c) Coccygeal nerves	3) 7 pairs
d) Cervical nerves	4) 12 pairs
	5) 5 pairs

(A) a - 4, b - 1, c - 3, d - 2
(B) a - 5, b - 3, c - 1, d - 2
(C) a - 3, b - 4, c - 2, d - 1
(D) a - 2, b - 5, c - 3, d - 1
(E) a - 5, b - 4, c - 1, d - 2

69. A typical angiosperm embryo sac at maturity is
(A) 4 nucleate - 2 celled
(B) 8 nucleate - 7 celled
(C) 4 nucleate - 4 celled
(D) 8 nucleate - 4 celled
(E) 2 nucleate - 1 celled

70. Spermatids are transformed into spermatozoa by
(A) spermiation
(B) spermatogenesis
(C) meiosis
(D) spermatosis
(E) spermiogenesis

71. Habitat loss and fragmentation, over exploitation, alien species invasion and co-extinction are causes for
(A) population explosion
(B) migration
(C) biodiversity loss
(D) pollution
(E) ecological succession

72. The venue and year of the Earth Summit on Conservation of Biodiversity was
(A) South Africa, 2002
(B) Rio de Jeneiro, 1992
(C) Johannesberg, 2004
(D) Stockholm, 1974
(E) Ramsar,1974

73. Neurasthenia refers to

(A) undue concern about health
(B) traumatic experience like rape
(C) disorder of sensory perception
(D) mental inability to concentrate on or enjoy things
(E) a mood upswing

74. Diacetyl morphine is commonly known as

(A) morphine
(B) cannabis
(C) heroin
(D) cocaine
(E) hashish

75. Choose the **wrong** statement

(A) HIV virus has RNA as its genetic material
(B) HIV virus replicates in T_H lymphocytes
(C) Anti-retroviral drugs are only partially effective for AIDS treatment
(D) HIV spreads by sexual contact or sharing needle with the infected person and not by mere touch or physical contact
(E) The time-lag between the infection and appearance of AIDS symptom may vary from few hours to a week

76. The cancer of the epithelial cells is called

(A) leukemia
(B) lipoma
(C) sarcoma
(D) emphysema
(E) carcinoma

77. Match the scientists and their contributions in the field of evolution

i) Charles Darwin	a) Mutation theory
ii) Lamarck	b) Germ plasm theory
iii) Hugo De Vries	c) Philosophie Zoologique
iv) Ernst Haeckel	d) The Origin of species
v) August Weismann	e) Biogenetic law
	f) Essay on population

(A)	i – d,	ii – c,	iii – a,	iv – e,	v – b
(B)	i – d,	ii – c,	iii – e,	iv – a,	v – f
(C)	i – f,	ii – d,	iii – e,	iv – c,	v – a
(D)	i – b,	ii – c,	iii – a,	iv – e,	v – b
(E)	i – c,	ii – d,	iii – a,	iv – e,	v – b

78. Hardy – Weinberg equilibrium is known to be affected by gene flow, genetic drift, mutation, genetic recombination and

(A) evolution
(B) limiting factors
(C) saltation
(D) natural selection
(E) over production

79. Industrial melanism was highlighted by

(A) Mimosa pudica
(B) Triticum aestivum
(C) Biston betularia
(D) Rock python
(E) Polar bear

80. How many pairs of cranial nerves originate from the brain of rat?

(A) 12
(B) 8
(C) 9
(D) 11
(E) 10

81. In which of these following phyla, while the adult shows radial symmetry, the larva shows bilateral symmetry?

(A) annelids
(B) arthropods
(C) molluscs
(D) echinoderms
(E) porifera

82. Match List I with List II and select the correct option

	List I		List II
a.	Protozoa	1.	Pennatula
b.	Aschelminthes	2.	Beroe
c.	Porifera	3.	Monocystis
d.	Ctenophora	4.	Wuchereria
e.	Cnidaria	5.	Cliona

(A) a-3, b-5, c-4, d-1, e-2
(B) a-4, b-3, c-5, d-2, e-1
(C) a-3, b-4, c-5, d-2, e-1
(D) a-2, b-4, c-5, d-3, e-1
(E) a-3, b-4, c-5, d-1, e-2

83. The number of gills present in Osteichthyes is
(A) 2 pairs
(B) 6 – 15 pairs
(C) 5 pairs
(D) 4 pairs
(E) 12 pairs

84. The number of abdominal segments in male and female cockroach is
(A) 10, 10
(B) 9, 10
(C) 10, 11
(D) 8 , 10
(E) 9 , 9

85. In earthworm, the characteristic internal median fold of dorsal wall of the intestine called typhlosole is present in
(A) 5 to 9 segments
(B) 9 to 14 segments
(C) 26 to 35 segments
(D) 15 to last segment
(E) 35 to last segment

86. Select the correct order of classification of Rana tigrina upto genus
(A) Chordata, Craniata, Amphibia, Gnathostomata, Rana
(B) Chordata, Craniata, Gnathostomata, Amphibia, Rana
(C) Chordata, Amphibia, Gnathostomata, Craniata, tigrina
(D) Chordata, Craniata, Amphibia, Gnathostomata, tigrina
(E) Gnathostomata, Craniata, Chordata, Rana, tigrina

87. The cloaca in frog is a common chamber for the urinary tract, reproductive tract and
(A) alimentary canal
(B) portal system
(C) hepaticportal vessels
(D) notochord
(E) lymphatic system

88. The alveoli of lungs are lined by
(A) simple epithelium
(B) squamous epithelium
(C) cuboidal epithelium
(D) columnar epithelium
(E) ciliated epithelium

89. The type of cell junction which facilitates cell to cell communication is
(A) tight junction
(B) adhering junction
(C) gap junction
(D) desmosomes
(E) brush borders

90. The phenomenon of a single gene regulating several phenotypes is called
(A) Multiple allelism
(B) Epistasis
(C) Incomplete dominance
(D) Pleiotropism
(E) Co-dominance

91. Inheritance of blood group is a condition of
I) Co-dominance
II) Incomplete dominance
III) Multiple allelism
IV) Multiple gene
(A) I, II
(B) II, IV
(C) II, III
(D) I, IV
(E) I, III

92. When a dihybrid cross is fit into a Punnett square with 16 boxes, the maximum number of different phenotypes available are
(A) 8 (B) 4 (C) 2 (D) 16 (E) 12

93. Sex chromosomes of a female bird are represented by
(A) XO (B) XX (C) XY (D) ZZ (E) ZW

94. A man can inherit his X chromosome from
(A) his maternal grand mother or maternal grand father
(B) his father
(C) his maternal grand father only
(D) his paternal grand father
(E) his paternal grand mother

95. Match the human genetic disorder with the causative abnormal chromosome

a.	sickle cell anaemia	1.	sex linked (X chromosome)
b.	colour blindness	2.	autosomal chromosome 7
c.	phenylketonuria	3.	autosomal chromosome 11
d.	cystic fibrosis	4.	autosomal chromosome 4
e.	Huntington's disease	5.	autosomal chromosome 12

(A) a-3, b-5, c-1, d-2, e-4
(B) a-5, b-1, c-2, d-3, e-4
(C) a-4, b-1, c-5, d-2, e-3
(D) a-3, b-1, c-5, d-2, e-4
(E) a-2, b-1, c-5, d-3, e-4

96. When a mutation is limited to the substitution of one nucleotide for another, it is called

(A) translocation
(B) point mutation
(C) base inversion
(D) sugar phosphate deletion
(E) frame shift

97. Cri-du-chat (cry of the cat) syndrome occurs in human babies due to

(A) Deletion
(B) Duplication
(C) Inversion
(D) Simple translocation
(E) Reciprocal translocation

98. Down's syndrome is an example of

(A) aneuploidy
(B) polyteny
(C) polyploidy
(D) monoploidy
(E) triploidy

99. In a pedigree analysis, □=**O** represents

(A) unrelated mating
(B) consanguinous mating
(C) affected parents
(D) siblings
(E) non-identical twins

100. Which of these is not a Mendelian disorder?

(A) cystic fibrosis
(B) sickle cell anaemia
(C) colour blindness
(D) haemophilia
(E) Turner's syndrome

101. The haploid content of human DNA is

(A) 3.3×10^9 bp (B) 3.3×10^9 kbp (C) 4.6×10^6 bp
(D) 48502 bp (E) 1.65×10^9 bp

102. Gynaecomastia is a symptom of

(A) Down's syndrome
(B) Klinefelter's syndrome
(C) Turner's syndrome
(D) Alzheimer's disease
(E) Phenylketonuria

103. The distance between the genes a, b, c and d in mapping units are
a – d = 3.5; b – c = 1; a – b = 6; c – d = 1.5; a – c = 5
Find out the sequence of arrangement of these genes

(A) acdb (B) abcd (C) acbd (D) adbc (E) adcb

104. Meselson and Stahl experiment proved

(A) DNA is genetic material
(B) central dogma
(C) transformation
(D) semi conservative DNA replication
(E) transduction

105. Match List I with List II and select the correct option

List I	List II
a. *Bacillus thuringiensis*	1. production of chitinases
b. *Rhizobium meliloti*	2. scavenging of oil spills
c. *Escherichia coli*	3. incorporation of 'nif' gene
d. *Pseudomonas putida*	4. production of Bt toxin
e. *Trichoderma*	5. production of human insulin

(A) a-2, b-4, c-1, d-5, e-3
(B) a-2, b-4, c-5, d-1, e-3
(C) a-4, b-3; c-5, d-2, e-1
(D) a-3, b-4, c-5, d-1, e-2
(E) a-4, b-2, c-5, d-3, e-1

106. The construction of the first recombinant DNA was done by using the native plasmid of
(A) E.coli
(B) Salmonella typhimurium
(C) B.thuringiensis
(D) Yeast
(E) Agrobacterium

107. The basis of DNA fingerprinting is
(A) the double helix
(B) errors in base sequence
(C) polymorphism in sequence
(D) DNA replication
(E) DNA coiling

108. Statements
1. The element which is very important for the production of thyroxine is iodine
2. Vitamin B_6 is otherwise known as niacin or nicotinic acid
3. Fructose is a monosaccharide and is a hexose sugar
4. Globulin is an example for a conjugated protein

Of the above statements
(A) 1, 2 and 3 are correct but 4 is wrong
(B) 1 and 3 are correct but 2 and 4 are wrong
(C) 1 and 2 are correct but 3 and 4 are wrong
(D) 1 is correct while 2, 3 and 4 are wrong
(E) 1, 3 and 4 are correct but 2 is wrong

109. 'Crypts of Lieberkuhn' are found in
(A) Gall bladder (B) Liver (C) Pancreas
(D) Intestinal tracts (E) Salivary glands

110. Glisson's capsule is associated with
(A) Liver (B) Pancreas (C) Lung
(D) Kidney (E) Adrenal glands

111. The main digestive function of enterokinase is
(A) conversion of casein into paracasein
(B) conversion of pepsinogen into pepsin
(C) conversion of trypsinogen into trypsin
(D) stimulation of the gastric glands to secrete gastric juice
(E) conversion of trypsin into trypsinogen

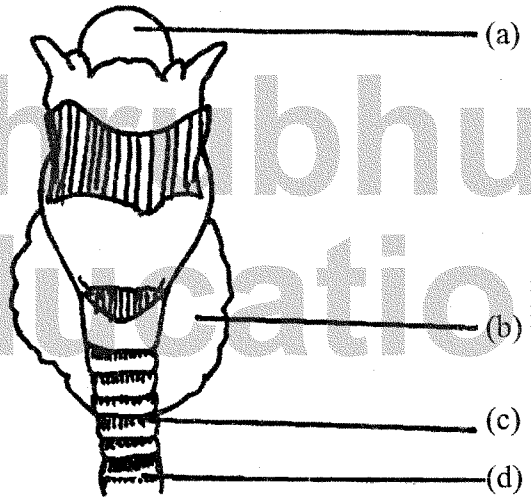
112. In which of these animals, antennal gland functions as excretory organ?

(A) Human being (B) Cockroach (C) Planaria
(D) Prawn (E) Earthworm

113. About 97% of O_2 is transported by RBC. The remaining 3% is

(A) dissolved in plasma and transported
(B) remains in lungs
(C) attached to cell membranes
(D) inside the mitochondria
(E) in peroxisomes

114. The diagram represents the human larynx. Choose the correct combination of labelling from the options given



(A) (a) - Larynx, (b) - Parathyroid, (c) - Tracheal cartilage, (d) - Trachea
(B) (a) - Naso larynx, (b) - Thyroid, (c) - Tracheal cartilage, (d) - Trachea
(C) (a) - Trachea, (b) - Thyroid, (c) - Bronchiole, (d) - Tracheal cartilage
(D) (a) - Epiglottis, (b) - Thyroid, (c) - Tracheal cartilage, (d) - Trachea
(E) (a) - Epiglottis, (b) - Parathyroid, (c) - Trachea, (d) - Tracheal cartilage

115. Histamine and heparin are secreted by

(A) monocytes
(B) neutrophils
(C) eosinophils
(D) lymphocytes
(E) basophils

116. In the thin filament of skeletal muscle fibre, a small globular protein, that masks the active sites on the F-actin is

(A) G-actin
(B) actin
(C) tropomyosin
(D) troponin
(E) myosin

117. Open circulatory system is present in

I) arthropods
II) annelids
III) chordates
IV) molluscs

(A) III only
(B) III and II
(C) I and II
(D) IV only
(E) I only

118. JG cells, under low glomerular blood flow, release

(A) angiotensin I
(B) angiotensin II
(C) renin
(D) aldosterone
(E) ADH

119. The opening of right atrium into right ventricle of human heart is guarded by

(A) mitral valve
(B) pulmonary semilunar valve
(C) aortic semilunar valve
(D) bicuspid valve
(E) tricuspid valve

120. The pineal gland secretes

(A) vasopressin
(B) melanin
(C) melatonin
(D) MSH
(E) prolactin