Code-○

ANSWERS & HINT
for
WBJEEM - 2015
SUB : BIOLOGY

CATEGORY - I (Q1 to Q90)

Each question has one correct option and carries 1 mark, for each wrong answer 1/4 mark will be deducted.

1. Passage cells help in

   (A) transport of water towards pericycle
   (B) transport of water towards epiblema
   (C) absorption of water from soil
   (D) passage of CO_2 towards stomata

   Ans : (A)

   Hint : Passage cells are endodermal cells lacking casparian strip which allow comparatively faster movement of water into stele.

2. Medullary rays are tissues made up of

   (A) phloem parenchyma
   (B) xylem parenchyma
   (C) sieve tube
   (D) sclerenchyma

   Ans : (B)

   Hint : Medullary rays or Wood rays are made up of xylem parenchyma.

3. An allosteric inhibitor of the enzyme acts by binding to the

   (A) substrate
   (B) product
   (C) catalytic site of the enzyme
   (D) non-catalytic site of the enzyme

   Ans : (D)

   Hint : Allosteric inhibitor attaches with non catalytic site of enzyme called 'Allosteric site'

4. A set of genes will be in a complete linkage when the progeny phenotypes for parental (P) and recombinant (R) types are

   (A) P = 0%, R = 100%
   (B) P = 50%, R = 50%
   (C) P < 50%, R > 50%
   (D) P = 100%, R = 0%

   Ans : (D)

   Hint : Since there is complete linkage, parental combinations are 100% and recombinant types are 0%

5. Which one of the following statements is **WRONG** in relation to transgenic Bt cotton plant?

   (A) Crop yield loss due to attack by *Bacillus thuringiensis* bacterium is reduced
   (B) Crop yield loss due to attack by lepidopteran insect pests is reduced
   (C) The use of chemical insecticides in the cotton field is minimized
   (D) Better quality cotton is produced

   Ans : (A)

   Hint : *Bacillus thuringiensis* does not attack cotton plants and hence cannot reduce crop loss.

6. Which one of the following natural polymers is found both in insects and fungi?

(A) pectin (B) chitin

(C) cellulose (D) suberin

Ans : (B)

Hint : Chitin is a natural structural polysaccharide, which is found in both insects and fungi.

7. Which one of the followings in an *in situ* method of biodiversity conservation?

(A) national park (B) botanical garden

(C) zoological garden (D) scientific laboratory

Ans : (A)

Hint : Botanical garden, zoological parks and scientific laboratory are *ex situ* methods of conservation.

8. Nucleosome contains

(A) only histone protein (B) both DNA and histone protein

(C) only DNA (D) both DNA and RNA

Ans : (B)

Hint : Nucleosome contains both DNA and histone protein.

9. Which one of the following matching pairs is **WRONG**?

(A) Mollusca-Pseudocoel (B) Cnidaria-Nematocyst

(C) Annelida-Chloragogen cells (D) Echinodermata-Water vascular system

Ans : (A)

Hint : Mollusca has schizocoelom [true coelom], while Aschelminthes has pseudocoelom.

10. Which one of the following matching pairs is **WRONG**?

(A) Shell fish-Pisces (B) Silver fish-Arthropoda

(C) Cuttle fish-Mollusca (D) Star fish-Echinodermata

Ans : (A)

Hint : Shell fish are edible aquatic invertebrates, including various species of molluscs, crustaceans and echinoderms.

11. Third stage larva of *Wuchereria bancrofti* carried by *Culex* mosquito is called

(A) cysticercus (B) merozoite

(C) microfilariae (D) trophozoite

Ans : (C)

Hint : Third stage of microfilariae are larva of *Wuchercria bancrofti*, infective to human.

12. Persons suffering from sickle cell anaemia normally **DO NOT** suffer from

(A) cholera (B) malaria

(C) high blood pressure (D) hepatitis

Ans : (B)

Hint : Erythrocytic phase of *Plasmodium* fails to complete in sickle shaped RBCs, hence persons with sickle cell anaemia do not suffer from malaria.

13. Two related but geographically isolated species are known as

(A) sibling species (B) sympatric species

(C) taxonomic species (D) allopatric species

Ans : (D)

Hint : In allopatric speciation, two related species are isolated by geographical barriers.

14. Which hormone is responsible for reabsorption of water in kidney?

(A) ADH (B) STH

(C) ACTH (D) GTH

Ans : (A)

Hint : ADH is secreted under water stressed condition. It helps in reabsorption of more water in kidney and maintain body fluid volume.

15. Wildlife Protection Act India was implemented in the year

(A) 1982 (B) 1988

(C) 1972 (D) 1970

Ans : (C)

Hint : Wildlife protection Act, India was implemented in year 1972.

16. All of the following symptoms are found in jaundice **EXCEPT**

(A) disorders of hepato-biliary system

(B) abnormal secretion of pancreatic and gastric juices

(C) bile duct obstruction

(D) anaemia

Ans : (B)

Hint : Pancreatic and gastric secretions remain unaffected during obstructive and haemolytic jaundice.

17. The hormone that stimulates the release of pancreatic juice is

(A) secretin (B) glucagon

(C) inhibin (D) insulin

Ans : (A)

Hint : Secretin stimulates the release of pancreatic juice, primarily bicarbonates.

18. Which one of the following combinations acts as a usual antigen binding site of an antibody?

(A) variable regions of a light and another heavy chain

(B) variable regions of two light chains

(C) variable regions of two heavy chains

(D) variable region of a heavy chain and constant region of a light chain

Ans : (A)

Hint : Antigen binding site [paratope] in an antibody includes variable regions of both heavy and light chains.

19. Which one of the followings is a causative agent of plague?

(A) *Shigella flexneri* (B) *Bordetella pertusis*

(C) *Staphylococcus aureus* (D) *Yersinia pestis*

Ans : (D)

Hint : Plague is bacterial disease caused by *Yersina pestis*.

20. Which one of the following hormones is responsible for uterine contraction during parturition?

(A) relaxin (B) vasopressin

(C) oxytocin (D) prolactin

Ans : (C)

Hint : Oxytocin helps in contraction of smooth muscles of uterine myometrium.

21. Melatonin is produced from
(A) pineal gland
(B) adrenal gland
(C) parathyroid gland
(D) ovary

Ans : (A)

Hint : Melatonin hormone is tryptophan derivative secreted by pineal gland.

22. Nitrogenase enzyme is a
(A) magnesium-iron protein
(B) molybdenum-iron protein
(C) iron-copper protein
(D) nickel-iron protein

Ans : (B)

Hint : Nitrogenase enzyme is a Mo-Fe protein.

23. Necrosis (die-back) of the tip of young leaves is caused due to the deficiency of
(A) iron
(B) manganese
(C) zinc
(D) copper

Ans : (D)

Hint : Necrosis (die-back) of tip of young leaves is due to deficiency of copper.

24. Guttation is a process of loss of water in
(A) liquid form containing dissolved minerals
(B) liquid form without dissolved minerals
(C) vapour form with minerals
(D) vapour form without minerals

Ans : (A)

Hint : Guttation is a process of loss of water in liquid form containing dissolved minerals through hydathodes.

25. Which one of the followings is **WRONG** for meiosis ?
(A) It leads to formation of sister chromatids
(B) It occurs in diploid cell
(C) It occurs in haploid cell
(D) It occurs by splitting of centromeres and separation of sister chromatids

Ans : (C)

Hint : Meiosis does not occur in haploid cells.

26. Which one of the following combination of all three fatty acids are essential for human beings ?
(A) oleic acid, linoleic acid and linolenic acid
(B) palmitic acid, linoleic acid and arachidonic acid
(C) oleic acid, linoleic acid and arachidonic acid
(D) linoleic acid, linolenic acid and arachidonic acid

Ans : (D)

Hint : These are unsaturated essential fatty acids, taken as supplement from plant sources.

27. Which one of the following information is essential to determine the genetic map distance between two genes located on the same chromosome ?
(A) length of the particular chromosome
(B) number of genes present in the particular chromosome
(C) number of nucleotides in the particular chromosome
(D) percentage of crossing over or recombinant frequency between the two genes

Ans : (D)

Hint : Recombination frequency or percentage of crossing over between two genes gives an idea of distance between adjacent genes.

28. What will be the percentage of guanine in a DNA molecule having 20% adenine ?

(A) 20% (B) 30%

(C) 40% (D) 60%

Ans : (B)

Hint : According to Chargaff's rule ; A = T ; C = G

If the % of A = 20%, therefore T = 20% or, A + T = 40%. Therefore, G + C = 60% and hence G = 30%

29. Which one of the following group of animals is homeothermic ?

(A) reptiles (B) amphibians

(C) birds (D) fishes

Ans : (C)

Hint : Birds and mammals can maintain their body temperature irrespective of external temperature variation.

30. Neoteny refers to

(A) development of gonads (B) moulting

(C) metamorphosis (D) retention of larval traits in the adult body

Ans : (D)

Hint : Neoteny refers to retention of larva traits [e.g. External gills] in adult Tiger Salamander [*Ambystoma*]

31. The overlapping zone in between two ecosystems is known as

(A) ecozone (B) biotope

(C) ecotone (D) buffer zone

Ans : (C)

Hint : The overlapping zone in between two ecosystems is known as ecotone.

32. The animal species controlling the ecosystem functioning is known as

(A) edge species (B) pioneer species

(C) keystone species (D) umbrella species

Ans : (C)

Hint : The animal species controlling the ecosystem functioning is known as keystone species.

33. Phenomenon involving increase in concentration of non-degradable pollutants from lower to higher trophic levels is called

(A) biomagnification (B) bioaccumulation

(C) biodegradation (D) bioinvasion

Ans : (A)

Hint : Phenomena involving increase in concenteration of non-biodegradable pollutants from lower to higher tropic levels is called biomagnification.

34. Which one of the following animals is uricotelic ?

(A) Lizard (B) Camel

(C) Toad (D) Rohu fish

Ans : (A)

Hint : Excretory product in lizard is uric acid.

35. Zymogenic cells of gastric gland secrete

(A) pepsinogen (B) trypsin

(C) pepsin (D) chymotrypsin

Ans : (A)

Hint : Zymogenic cells of gastric glands secrete inactive pepsinogen, activated into pepsin by HCl.

36. During entry into the ovum, acrosome of sperm releases
(A) hyaluronidase (B) alkaline phosphatase
(C) acid phosphatase (D) carbonic anhydrase

Ans : (A)

Hint : Hyaluronidase dissolves hyaluronic acid [cementing material] of corona radiata around ovum.

37. The epithelium found in the inner linings of stomach and intestine is
(A) columnar (B) squamous
(C) stratified (D) pseudo-stratified

Ans : (A)

Hint : Inner lining of stomach and intestine is made of simple columnar epithelium.

38. Central dogma in molecular biology is
(A) RNA → DNA → Protein (B) DNA → RNA → Protein
(C) RNA → Protein → DNA (D) DNA → Protein→ RNA

Ans : (B)

Hint : Central dogma in molecular biology given by Francis Crick states that : DNA → RNA → Protein

39. Which one of the followings is the functional unit of hearing ?
(A) utricle (B) organ of Zuckerkandl
(C) organ of Corti (D) vestibular apparatus

Ans : (C)

Hint : Organ of Corti is the auditory sensory part in the cochlea.

40. Whcih one of the followings is **NOT** a refractive medium of the eye ?
(A) lens (B) vitreous humour
(C) aqueous humour (D) pupil

Ans : (D)

Hint : Pupil is an aperture through which light enter into eyes. Other parts are refractive media.

41. The heart is covered by
(A) epicardium (B) pericardium
(C) supracardium (D) endocardium

Ans : (B)

Hint : Heart is covered by double layered Pericardium.

42. What is the stroke volume of an adult human heart?
(A) 50 ml (B) 70 ml
(C) 90 ml (D) 100 ml

Ans : (B)

Hint : 70 ml blood is ejected by left ventricle during each ventricular systole, called stroke volume.

43. Which one of the following cocci appears like grapes under microscope?
(A) streptococci (B) diplococci
(C) staphylococci (D) pneumococci

Ans : (C)

Hint : Arrangement of cocci looks like an irregular bunch of grapes representing Staphylococci.

44. Which one of the following components of urine in a healthy human **DOES NOT** differ much in concentration from that of blood plasma?

(A) NH_4^+ (B) K^+

(C) Na^+ (D) SO_4^{2-}

Ans : (D)

Hint : SO_4^{2-} is a non-threshold substance.

45. Antibodies produced by a group of identical B-cells against a single epitope of an antigen is called

(A) polyclonal antibodies (B) monoclonal antibodies

(C) anti-hapten antibodies (D) somaclonal antibodies

Ans : (B)

Hint : Monoclonal antibodies are produced by Hybridoma technique.

46. Vernalization promotes flowering by

(A) low temperature (B) high temperature

(C) prolonged photoperiod (D) short photoperiod

Ans : (A)

Hint : Vernalization is the acquisition of a plant's ability to flower in the spring by exposure to prolonged cold of winter.

47. C_4 pathway is advantageous over C_3 pathway in plants as it

(A) occurs in relatively low CO_2 concentration (B) uses more amount of water

(C) occurs in relatively low O_2 concentration (D) is less efficient in energy utilization

Ans : (A)

Hint : C_4 plants, due to double carboxylation can utilize even relatively low CO_2 concentration.

48. TCA cycle enzymes are located in

(A) cristae (B) outer membrane

(C) mitochondrial matrix (D) mitochondrial intermembrane space

Ans : (C)

Hint : TCA cycle (Krebs' cycle) enzymes are located in mitochondrial matrix.

49. During waste water treatment, trickling filter is used for

(A) primary treatment (B) secondary aerobic treatment

(C) secondary anaerobic treatment (D) tertiary treatment

Ans : (B)

Hint : During waste water treatment, trickling biofilter, is a biological reactor that operates under aerobic conditions within the waste water treatment plant.

50. The apoplast is located

(A) outside the plasma membrane (B) in the entire cytosol

(C) on both sides of plasma membrane (D) in the plastidial content

Ans : (A)

Hint : Apoplast is the free diffusional space outside the plasma membrane formed by cell wall and intercellular space between cells.

51. The aleurone synthesizes and secretes digestive enzymes that hydrolyze nutrients stored in the endosperm, in presence of

(A) auxin (B) gibberellin

(C) cytokinin (D) ethylene

Ans : (B)

Hint : Gibberelins in the seed embryo signals starch hydrolysis through synthesis of enzyme α-amylase in the aleurone cells.

52. ATP synthesis in cell requires

(A) H^+ gradient across the membrane
(B) K^+ gradient across the membrane
(C) PO_4^{3-} gradient across the membrane
(D) Ca^{2+} gradient across the membrane

Ans : (A)

Hint : ATP synthesis in cell requires proton gradient across the inner membrane of mitochondria

53. Which one of the following statements is **WRONG**?

(A) Insects have one pair of antennas.
(B) Millipedes possess two pairs of appendages in each segment of the body.
(C) Prawns have two pairs of antennas.
(D) Animals belonging to the phylum Porifera have nematocyst.

Ans : (D)

Hint : Nematocysts are found in phylum Cnidaria

54. Which one of the followings is **NOT** a characteristic feature of mammals?

(A) diphyodont tooth
(B) ten pairs of cranial nerves
(C) seven cervical vertebrae
(D) left aortic arch in the circulatory system

Ans : (B)

Hint : 12 pairs of cranial nerves are found in mammals.

55. Which one of the following combinations is **WRONG**?

(A) Rio convention – air pollution
(B) Kyoto protocol – climate change
(C) Montreal protocol – ozone depletion
(D) Ramsar convention – wetland conservation

Ans : (A)

Hint : Rio convention relates to biodiversity, climatic change and desertification.

56. Relationship between DO and BOD is that they

(A) are directly proportional
(B) are inversely proportional
(C) are not related
(D) always remain equal to each other

Ans : (B)

Hint : Relationship between $BOD \propto \frac{1}{DO}$ because as BOD increases, the DO decreases in water bodies.

57. What is the full form of MAB?

(A) Man And Biosphere
(B) Man And Biosphere Reserve
(C) Man And Biosphere Reserve Programme
(D) Man And Biosphere Programme

Ans : (D)

Hint : MAB → Man and Biosphere Programme

58. The 'Red Data Book" records

(A) species diversity of wetlands
(B) list of water pollutants
(C) list of threatened species
(D) rate of population decline

Ans : (C)

Hint : The 'Red data Book' records list of threatened species.

59. Beta (β) diversity refers to diversity

(A) within a community
(B) between communities
(C) between two eco zones
(D) within a population

Ans : (B)

Hint : Beta diversity refers to diversity between communities

60. The eukaryotic cells have all of the followings **EXCEPT**

(A) peptidoglycan in the cell wall
(B) the 80S ribosome
(C) nuclear membrane
(D) mitochondria

Ans : (A)

Hint : Eukaryotic cell wall lacks peptidoglycan instead is made up of cellulose mainly.

61. Which of the followings **DOES NOT** occur in the interphase of eukaryotic cell division?

(A) increase of ATP synthesis
(B) increase of DNA synthesis
(C) increase of RNA synthesis
(D) reduction in cell size

Ans : (D)

Hint : During interphase of eukaryotic cell division, reduction in cell size does not occur.

62. Lac tose (*Lac*) Operon is regulated by

(A) Lac repressor only
(B) Lac repressor and CAP-cGMP complex
(C) Lac repressor and CAP-cAMP complex
(D) CAP-cAMP and CAP-cGMP complex

Ans : (C)

Hint : Lac operon is regulated negatively by Lac repressor and positively by CAP-cAMP complex

63. Which one of the followings acts solely as an inhibitory neurotransmitter?

(A) norepinephrine
(B) gamma (γ) amino butyric acid
(C) acetylcholine
(D) dopamine

Ans : (B)

Hint : Gamma amino butyric acid acts solely as inhibitory neurotransmitter of CNS mainly in mammalia.

64. Which one of the following antibiotics kills bacterial cells by inhibiting the polymerization of peptidoglycan?

(A) aminoglycosides
(B) fluoroquinolones
(C) quinines
(D) penicillins

Ans : (D)

Hint : Penicilin (antibiotic) inhibits polymerization of peptidoglycan

65. Indicate the **CORRECT** sequence during spermatogenesis.

(A) Spermatozoa → spermatogonia → spermatid → spermatocyte
(B) Spermatogonia → spermatocyte → spermatid → spermatozoa
(C) Spermatid → spermatocyte → spermatozoa → spermatogonia
(D) Spermatocyte → spermatozoa → spermatid → spermatogonia

Ans : (B)

Hint : Spermatogenesis is the formation of Spermatogonia → Primary spermatocyte → Secondary spermatocyte → Spermatid → Spermatozoa

66. Which one of the followings is called intra-specific chemical messenger?

(A) pheromones
(B) prostaglandins
(C) corticotrophin
(D) catecholamines

Ans : (A)

Hint : Pheromone is an ectohormone acting as intra-specific chemical messenger

67. Elongation of internode is caused by
(A) ethylene (B) gibberellin
(C) abscisic acid (D) cytokinin

Ans : (B)

Hint : Phytohormone gibberellin is responsible for elongation of internode

68. Endosperm nucleus is
(A) n (B) 2n
(C) 3n (D) 4n

Ans : (C)

Hint : In angiosperms, endosperm nucleus is the product of triple fusion and is 3n (triploid).

69. Banana is an example of
(A) parthenocarpy (B) apomixis
(C) parthenogenesis (D) polyembryony

Ans : (A)

Hint : Parthenocarpy is the production of fruit without fertilization of ovule. The fruit is therefore seedless like in banana.

70. Stock and scion are used in
(A) cutting (B) grafting
(C) layering (D) micropropagation

Ans : (B)

Hint : A small shoot of plant with superior traits is employed called graft or scion. The root system of another plant is allowed to remain intact called stock.

71. Egg in female gametophyte is accompanied by
(A) Antipodal cells (B) Synergids
(C) Definitive nucleus (D) Tube nucleus

Ans : (B)

Hint : Egg in female gametophyte is accompanied by two synergids.

72. Malacophily is the pollination by
(A) insects (B) birds
(C) snails (D) mammals

Ans : (C)

Hint : Pollination by snails is called malacophily.

73. Grittiness of pear fruit is caused by
(A) sclereides (B) raphides
(C) collenchyma (D) dead parenchyma cells

Ans : (A)

Hint : Grittiness of pear fruit is caused by stone cells (sclereides)

74. Which one of the following organisms is **NOT** used as biocontrol agent?
(A) *Bacillus sphaericus* (B) *Trichoderma viride*
(C) *Bacillus thuringiensis* (D) *Bacillus subtilis*

Ans : (D)

Hint : *Bacillus subtilis* yields antibiotic subtilin.

75. Which one of the followings is **CORRECT** for blooming of 'short day' plants?
(A) The long dark period is not critical
(B) It is affected by interruption of long dark period by brief exposure of light
(C) It is not affected by interruption of long dark period by brief exposure of light
(D) It is affected if the continuous light period is interrupted

Ans : (B)

Hint : Long dark period by interruption with brief exposure of light inhibits flowering in short day plants.

76. A dicotyledonous plant forms crown gall when
(A) *Agrobacterium tumefaciens* comes in contact with the plant
(B) *Agrobacterium rhizogenes* comes in contact with the plant
(C) a specific part of DNA from the Ti plasmid gets integrated with the plant chromosome
(D) a specific part of DNA from the Ri plasmid gets integrated with the plant chromosome

Ans : (C)

Hint : Crown gall disease is caused in plant by *Agrobacterium tumefaciens* which integrates its Ti plasmid into the plant chromosome

77. Gene therapy has been successful in curing genetic diseases in laboratory animals through
(A) exposure to X-ray to rectify the defective gene
(B) replacing the defective gene with a functional gene
(C) oral delivery of genes
(D) use of therapeutic medicines to rectify the defective gene

Ans : (B)

Hint : In gene therapy defective gene is replaced with a functional gene

78. Which one of the following statements is relevant to sex linked characters?
(A) They always follow criss-cross inheritance
(B) They do not follow criss-cross inheritance
(C) They are mostly present on Y chromosome
(D) They are only present on X chromosome

Ans : (A)

Hint : Sex linked character can be X-linked or Y-linked but follow criss-cross inheritance.

79. Which one of the following insecticides is of plant origin?
(A) Ecdysone (B) Rotenone
(C) Parathion (D) Malathion

Ans : (B)

Hint : Rotenone is obtained from roots of *Derris elliptica*

80. The resting state of reptiles in winter is
(A) hibernation (B) aestivation
(C) diapause (D) moulting

Ans : (A)

Hint : The resting stage of reptiles and several cold blooded animals in winter is called as hibernation.

81. *Archaeopteryx* is a connecting link between

(A) pisces and amphibians
(B) amphibians and reptiles
(C) reptiles and birds
(D) birds and mammals

Ans : (C)

Hint : *Archaeopteryx* is a connecting link between reptiles and aves.

82. The enzyme peptidyl transferase of prokaryotes resides in

(A) 50S ribosome
(B) 30S ribosome
(C) 40S ribosome
(D) 60S ribosome

Ans : (A)

Hint : The enzyme peptidyl transferase(23S rRNA) which is a type of ribozyme, found in 50S larger subunit of ribosome of prokaryotes.

83. Which one of the followings is **CORRECT** for the transmembrane proteins in lipid bilayer ?

(A) They are absent in animal cells
(B) They act as channel proteins
(C) They are absent in plant cells
(D) They are only externally located

Ans : (B)

Hint : Channel protein is a type of transmembrane protein in lipid bilayer to allow transport of molecules.

84. Engulfing of solid materials by cells is called

(A) pinocytosis
(B) phagocytosis
(C) active transport
(D) autolysis

Ans : (B)

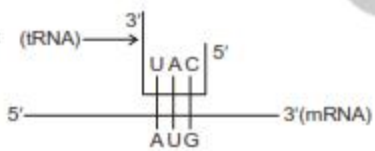
Hint : The process of engulfing of solid material by infolding of plasma membrane is called phagocytosis.

85. The tRNA anticodon 3'-UAC-5' will pair with the mRNA codon

(A) 5'-AUU-3'
(B) 5'-UAC-3'
(C) 5'-AUG-3'
(D) 3'-GUA-5'

Ans : (C)

Hint :



86. Peroxisomes have

(A) ribosome
(B) DNA
(C) catalase enzyme
(D) centrosome

Ans : (C)

Hint : Peroxisomes have catalase enzyme to break hydrogen peroxide into water and O_2.

87. Which one of the following secretes glucagon ?

(A) beta (β) cells of islets of Langerhans
(B) alpha (α) cells of islets of Langerhans
(C) acidophilic cells of adenohypophysis
(D) basophilic cells of adenohypophysis

Ans : (B)

Hint : Glucagon is a polypeptide hormone secreted by α-cell of Islet of Langerhans.

88. Osteoid refers to

(A) the smallest bone of the body

(B) young hyaline matrix of true bone in which calcium salts are deposited

(C) membranous ossification of cranium

(D) the largest bone of the body

Ans : (B)

Hint : Osteoid is the unmineralized organic portion of the bone matrix in which calcium salts are deposited during maturation.

89. The bundle of axons in the central nervous system is known as

(A) nerve (B) ganglion

(C) tract (D) neuron

Ans : (C)

Hint : Bundle of axon in CNS is tract and in PNS is nerve.

90. Which one of the following enzymes is responsible for the conversion of norepinephrine to epinephrine ?

(A) catecholamine-O-methyltransferase (B) phenylalanine-N-methyltransferase

(C) DOPA decarboxylase (D) monoamine oxidase

Ans : (B)

Hint : In Adrenal medulla nor-epinephrine is converted into epinephrine by PNMT.

CATEGORY - II (Q91 to Q105)

Each question has one correct option and carries 2 marks, for each wrong answer 1/2 mark will be deducted.

91. Match Column-I with Column-II

Column - I	Column - II
P. Cytology	i. Study of fossils
Q. Entomology	ii. Study of cells
R. Palaeontology	iii. Study of birds
S. Ornithology	iv. Study of insects

(A) P-ii, Q-iii, R-iv, S-i (B) P-ii, Q-iv, R-i, S-iii

(C) P-i, Q-ii, R-iv, S-iii (D) P-iii, Q-ii, R-i, S-iv

Ans : (B)

Hint : Cytology, entomology, palaeontology and ornithology are studies of cell, insects, fossils and birds respectively.

92. Genes for maternal inheritance are located in

(A) golgi bodies (B) mitochondria

(C) lysosome (D) nucleolus

Ans : (B)

Hint : Mitochondria contain genes responsible for maternal/cytoplasmic gene inheritance.

93. Match Column-I with Column-II

Column - I	Column - II
P. Producer	i. Herbivores
Q. Primary consumer	ii. Green plants
R. Secondary consumer	iii. Saprotrophs
S. Decomposer	iv. Carnivores

(A) P-i, Q-ii, R-iii, S-iv
(B) P-ii, Q-i, R-iv, S-iii
(C) P-ii, Q-iv, R-iii, S-i
(D) P-iii, Q-ii, R-i, S-iv

Ans : (B)

Hint : Columns will be matched according to mode of nutrition in a food chain.

94. Two-membrane envelope is found in

(A) mitochondria, golgi apparatus and chloroplast
(B) mitochondria, nucleus and chloroplast
(C) nucleus, golgi apparatus and endoplasmic reticulum
(D) nucleus, ribosome and chloroplast

Ans : (B)

Hint : Mitochondria, nucleus and chloroplast are double membrane bound organelles.

95. Match the items in Column-I with those in Column-II, and choose the **CORRECT** answer.

Column - I	Column - II
P. *Thiobacillus*	i. Nitrogen fixation
Q. *Nitrosomonas*	ii. Ammonification
R. *Azotobacter*	iii. Nitrification
S. *Pseudomonas*	iv. Denitrification

(A) P - iv, Q-iii, R-i, S-ii
(B) P - iii, Q-iv, R-i, S-ii
(C) P - iv, Q-ii, R-i, S-iii
(D) P - ii, Q-i, R-iii, S-iv

Ans : (A)

Hint : *Thiobacillus* performs Denitrification, *Nitrosomonas* performs nitrification, *Azotobacter* performs nitrogen fixation and *Pseudomonas* performs ammonification

96. Match Column-I with Column-II

Column - I	Column - II
P. Vitamin B_1	i. Accumulation of fat
Q. Gastric juice	ii. Loss of fat
R. Starvation	iii. Pepsin
S. Obesity	iv. Beriberi

(A) P - iii, Q-iv, R-ii, S-i
(B) P - iii, Q-iv, R-i, S-ii
(C) P - iv, Q-iii, R-ii, S-i
(D) P - iv, Q-ii, R-iii, S-i

Ans : (C)

Hint : Deficiency of vitamin B_1 causes beriberi. Gastric juice contains pepsin. In starvation fat is used and in obesity fat is gained.

97. Select **CORRECT** combination of statements for DNA fingerprinting.

(i) It is ELISA based technique

(ii) It is PCR based technique

(iii) It is used by forensic scientists

(iv) It is based on the fingerprint of the individual

(v) It is a test for paternity

(A) i, ii, iii

(B) ii, iii, v

(C) i, iv, v

(D) i, iii, iv

Ans : (B)

Hint : In DNA fingerprinting PCR is applied. It is used in forensic science and is also used as test for paternity.

98. Match the items in Column-I with those in Column-II, and choose the **CORRECT** answer

Column - I	Column - II
P. Mitosis	i. Occurs in diploid cells only
Q. Meiosis	ii. Occurs in both haploid and diploid cells
	iii. Daughter and parent cells have same chromosome numbers
	iv. Synapsis of homologous chromosomes

(A) P - i, Q-ii

(B) P - ii, Q-iii

(C) P - iii, Q-iv

(D) P - iv, Q-i

Ans : (C)

Hint : Mitosis - Daughter and parent cells have same chromosome numbers.

Meiosis - Synapsis of homologous chromosomes occur.

99. A male rabbit of genotype '***AABBDDEE***' is crossed with a female rabbit of genotype '***aabbddee***' to produce F_1 hybrid offspring. How many genetically different gametes can be produced by this F_1 hybrid?

(A) 4

(B) 8

(C) 16

(D) 32

Ans : (C)

Hint : P : AABBDDEE (♂) X aabbddee (♀)

↓

F_1 : AaBbDdEe

Types of gametes formed = 2^n

(tetrahybrid)2^4 = 2×2×2×2 = 16 gametes

100. Select **CORRECT** combination of statements regarding Myasthenia gravis.

(i) It is an autoimmune disorder

(ii) It causes insufficient acetylcholine binding that affects muscular contraction

(iii) Antibodies are developed against acetylcholine

(iv) Antibodies are developed against acetylcholine receptors

(v) Antibodies are developed against acetylcholine esterase

(vi) It causes drooping of eyelids

(A) i, iii, iv, vi

(B) i, iii, v, vi

(C) i, ii, iv, vi

(D) ii, iii, iv, v

Ans : (C)

Hint : Myasthenia gravis is an autoimmune disorder in which Ach receptor gets damaged.

101. Each 100 ml of human arterial blood carries 'P' ml of O_2 and 'Q' ml of CO_2 whereas each 100 ml of venous blood carries 'R' ml of O_2 and 'S' ml of CO_2. Choose the **CORRECT** values of P, Q, R and S.

(A) P = 48 ml, Q = 19-20 ml, R = 52 ml, S = 14-15 ml (B) P = 19-20 ml, Q = 48 ml, R = 14-15 ml, S = 52 ml

(C) P = 14-15 ml, Q = 52 ml, R = 19-20 ml, S = 48 ml (D) P = 52 ml, Q = 14-15 ml, R = 48 ml, S = 19-20 ml

Ans : (B)

Hint : In oxygenated and deoxygenated blood the quantity of oxygen is approx 20 ml and 15 ml per 100 ml of blood and the level of CO_2 is 48 ml and 52 ml per 100 ml of blood respectively.

102. Match Column-I with Column-II.

Column-I	Column-II
P. Pollen grains	i. Photochemical smog
Q. PAN	ii. Particulate pollution
R. CO_2	iii. Global warming
S. Cadmium	iv. Itai itai disease

(A) P-ii, Q-i, R-iii, S-iv (B) P-iv, Q-ii, R-i, S-iii

(C) P-i, Q-ii, R-iii, S-iv (D) P-iii, Q-i, R-ii, S-iv

Ans : (A)

Hint : Pollen grains causes particulate pollution

PAN – Photochemical smog

CO_2 - causes – global warming

Cadmium - causes itai-itai disease.

103. Select **CORRECT** combination of statements for Lymph.

(i) It helps to maintain fluid balance of the body.

(ii) It is contained in lymphatic vessels and lymphatic organs in mammals.

(iii) It is derived from tissue fluid.

(iv) It contains less antibodies than plasma.

(v) It flows in both directions.

(vi) It helps to conserve proteins and remove bacteria.

(A) i, ii, iii, v (B) ii, iii, iv, vi

(C) i, iv, v, vi (D) iii, iv, v, vi

Ans : (B)

Hint : Since the flow of lymph is unidirectional but all other options have this statement, therefore (B) is the correct one.

104. Match the items in Column-I with those in Column-II, and choose the **CORRECT** answer.

Column-I	Column-II
P. Klinefelter syndrome	i. Mutation in autosomal gene
Q. Thalassaemia	ii. Mutation in sex chromosome-linked gene
R. Down syndrome	iii. Trisomy of autosome
S. Colour blindness	iv. Trisomy of sex chromosome

(A) P-i, Q-ii, R-iii, S-iv (B) P-ii, Q-iii, R-iv, S-i

(C) P-iii, Q-iv, R-i, S-ii (D) P-iv, Q-i, R-iii, S-ii

Ans : (D)

Hint : Klinefelter syndrome occur due to trisomy of sex chromosome. Thalessemia occur due to mutation in autosomal gene. Down syndrome occur due to trisomy of autosome. Colour blindness occur due to mutation in sex-chromosome linked gene.

105. An area is declared as "Hot Spot" when

(A) it has 1500 or more endemic species and 75% of its original habitat is lost

(B) it has 1500 or more vertebrate species and 75% of its original habitat is lost

(C) it has more than 2000 species of plants

(D) most of the species inhabiting the area is facing the risk of extinction

Ans : (A)

Hint : To qualify as a biodiversity 'Hot Spot', a region must meet two strict criteria:

1. It has 1500 or more endemic species.
2. 75% of its original habitat is lost.

CATEGORY - III (Q106 to Q120)

Each question has one or more correct option(s), choosing which will fetch maximum 2 marks on pro rata basis. However, choice of any wrong option(s) will fetch zero mark for the question.

106. Select the **CORRECT** combination(s) from the followings.

(A) Encephalitis -viral disease

(B) Kala-azar - *phlebotomus*

(C) Rhabditiform larvae - *Ascaris*

(D) *Entamoeba* - sporogony

Ans : (A,B,C)

Hint : Encephalitis is caused by several viruses. *Phlebotomas* acts as vector for spreading kala-azar. Rhabditiform larva is found in life-cycle of *Ascaris*.

107. Intrinsic and extrinsic pathways of blood clotting are interlinked at the activation steps of which of the following factors?

(A) factor IX

(B) factor IV

(C) factor X

(D) factor XIIIa

Ans : (A,C)

Hint : Intrinsic and Extrinsic pathways in blood clotting are interlinked at the activation steps of factor IX and X.

108. Which of the following pairs of cranial nerves is/are of mixed category?

(A) glossopharyngeal and hypoglossal

(B) trigeminal and abducens

(C) trigeminal and facial

(D) glossopharyngeal and vagus

Ans : (C,D)

Hint : Trigeminal [V], Facial [VII], Glossopharyngeal [IX] and Vagus [X] are mixed cranial nerves.

109. The usual cause(s) of peptic ulceration is/are

(A) lower rate of secretion of gastric juice

(B) higher rate of secretion of gastric and duodenal juices

(C) improper neutralization of gastric juice by duodenal juices

(D) imblance between the rate of secretion of gastric juice and the degree of protection offered by gastro-duodenal mucosa

Ans : (B,C,D)

Hint : Peptic ulcer is caused due to

– High rate of gastric and duodenal secretions, which erode epithelium.

– inadequate mucus secretion which fails to neutralise gastric juice.

110. Which of the following statements is/are **CORRECT** regarding the effects of pH on enzyme catalysed reactions?

(A) Direction of the reaction is influenced by [H^+].

(B) Ionization state of dissociating groups on the enzyme is modified.

(C) Ionization state of the substrate is modified.

(D) Protein is not denatured with the change in pH.

Ans : (A,B,C)

Hint : H^+ can change the direction of the reaction and their linkage with enzyme dissociating goups and substrate and can modify the Ionisation state of both.

111. Which of the following statements is/are **CORRECT** for transduction?

(A) It is observed in Gram positive and Gram negative bacteria.

(B) Bacteria should be in state of competence.

(C) Transfer of DNA by a bacteriophage takes place.

(D) Packaging of both host and phage DNA takes place.

Ans : (A,C,D)

Hint : Transduction is the process observed in Gram positive and Gram negative bacteria which involves transfer of DNA by a bacteriophage from one bacterium to the other where packaging of both host and phage DNA takes place. Competence is associated with transformation.

112. Which of the following features is/are **CORRECT** for heterochromatin of eukaryotic nucleus?

(A) It is highly expanded in interphase.

(B) It stains densely with basic dyes.

(C) It is highly condensed in interphase.

(D) It stains densely with acidic dyes.

Ans : (B,C)

Hint : Heterochromatin of eukaryotic nucleus is highly condensed in interphase and stains densely with basic dyes.

113. Which of the followings is/are **CORRECT** for the inheritance of genes involved in human 'ABO' blood grouping?

(A) It is inherited by complete dominant allele.

(B) It is inherited by complete recessive allele.

(C) It is inherited by co-dominant allele.

(D) It is inherited by single gene with mmre than two alleles.

Ans : (A,B,C,D)

Hint : $I^A = I^B > I^O$

114. *Antelop cervicapra* is

(A) a mammal

(B) commonly known as black buck

(C) an animal under data deficient category of wild life

(D) a threatened Indian wild life

Ans : (A,B,D)

Hint : *Antelope cervicapra* or black buck was declared as threatened animal by IUCN (WCU).

115. Select the **CORRECT** statement(s) pertaining to Chipko movement.

(A) It was led by Sunderlal Bahuguna.

(B) It was a tree hugging movement.

(C) It commenced in the Tehri-Garhwal district.

(D) It received global attention on environmental protection.

Ans : (A,B,C,D)

Hint : Chipko movement was a tree hugging movement led by sunderlal Bahuguna commenced in the Tehri-Garhwal which received global attention on environment protection.

116. Select the **CORRECT** combination(s) from the followings.

(A) Gir-Asiatic Lion (B) Sunderbans-Rhinoceros

(C) Periyar-Indian Elephant (D) Corbet National Park- Red Panda

Ans : (A,C)

Hint : Gir National Park Junagarh [Gujarat] – Lion.

Periyar Sanctuary [Kerala] – Indian Elephant.

117. Select the non-degradable pollutant(s) from the followings.

(A) plastic (B) organochlorine pesticides

(C) heavy metals (D) domestic sewage

Ans : (A,B,C)

Hint : Domestic sewage is biodegradable pollutant while others are non-biodegradable pollutants.

118. Opening and closing of stomata is controlled by

(A) abscisic acid (B) CO_2 concentration

(C) O_2 concentration (D) light intensity

Ans : (A,B,D)

Hint : Opening and closing of stomata is controlled by abscisic acid, CO_2 concentration and light intensity.

119. Which of these gases was/were present in prebiotic atmosphere?

(A) ammonia (B) methane

(C) oxygen (D) hydrogen

Ans : (A,B,D)

Hint : The Prebiotic atomosphere was reducing one and contained Methane, Ammonia and Hydrogen.

120. Which of these components is/are **NOT** present in Gram-negative bacteria?

(A) teichoic acid (B) pseudomurein

(C) lipopolysaccharide (D) mycolic acid

Ans : (A,B,D)

Hint : Lipopolysaccheride (Gram -ve), Mycolic acid (Actinomycetes, Gram +ve) Pseudomurein (Archaebacteria)

BIOLOGY

S.No.	○	◇	▽	□
1	A	D	C	A
2	B	A	B	A
3	D	B	D	C
4	D	C	A	A
5	A	B	C	B
6	B	D	C	D
7	A	A	D	B
8	B	C	D	A
9	A	D	B	B
10	A	C	C	A
11	C	A	D	D
12	B	C	B	A
13	D	D	B	B
14	A	D	D	D
15	C	A	C	B
16	B	A	B	A
17	A	A	B	A
18	A	A	C	B
19	D	A	A	A
20	C	B	D	A
21	A	C	B	B
22	B	D	B	D
23	C	B	C	C
24	A	B	B	B
25	C	A	A	C
26	C	B	A	B
27	D	A	A	D
28	B	B	A	A
29	C	D	B	C
30	D	C	D	A
31	C	B	A	D
32	C	B	B	C
33	A	D	C	B
34	A	B	D	A
35	A	A	B	A
36	A	B	D	B
37	A	C	B	D
38	A	A	A	B
39	C	D	B	A
40	B	A	C	D
41	B	B	A	C
42	B	A	B	A
43	C	C	A	B
44	D	B	B	C
45	B	B	B	A
46	A	C	B	B
47	A	A	C	B
48	C	A	B	D
49	B	C	A	A
50	A	D	B	B
51	B	A	D	C
52	A	B	C	A
53	D	A	A	D
54	B	A	A	C
55	A	B	A	D
56	B	A	A	D
57	D	A	A	B
58	C	A	A	C
59	B	B	B	B
60	A	A	A	B
61	D	B	B	C
62	C	C	A	D
63	B	D	A	C
64	D	C	B	D
65	B	C	B	A
66	A	B	A	B
67	B	C	A	A
68	C	D	B	C
69	A	A	B	A
70	B	A	C	A
71	B	A	A	A
72	C	C	B	A
73	A	D	D	A
74	C	A	B	A
75	B	A	A	B
76	C	A	A	A
77	B	D	B	C
78	A	C	C	C
79	B	B	D	B
80	A	C	C	C
81	C	A	C	D
82	A	B	A	B
83	B	B	A	B
84	B	C	C	A
85	C	B	A	C
86	C	A	D	B
87	B	B	C	B
88	B	B	A	C
89	C	C	C	D
90	B	C	A	B
91	B	B	B	C
92	B	A	A	C
93	B	C	C	B
94	B	C	B	B
95	A	A	D	D
96	C	B	A	C
97	B	A	A	B
98	C	B	B	A
99	C	B	B	A
100	C	C	A	D
101	B	B	A	A
102	A	D	B	C
103	B	A	B	B
104	D	C	A	A
105	A	B	C	B
106	A B C	B C D	A B C D	B C
107	A C	A C	A C	A B C D
108	C D	A C D	A B C	A B D
109	B C D	A B C D	A B D	A B C
110	A B C	A C	A B D	A C
111	A C D	A B C	A B D	C D
112	B C	A B C	B C D	A B D
113	A B C D	A C	A B C	A B D
114	A B D	C D	A C D	A B D
115	A B C D	A B D	B C	B C D
116	A C	A B D	A B C D	A B C
117	A B C	A B D	A B D	A C D
118	A B D	B C	A B C	A B C D
119	A B D	A B C D	B C	A C
120	A B D	A B D	C D	A B C