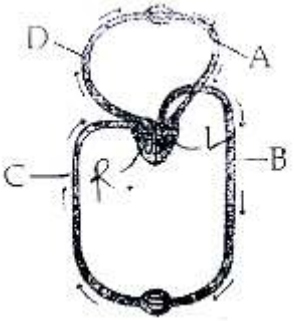
DR. ARVIND'S BIOLOGY CLASSES

(A Unit of Med-Xel Tutorials)

NEET – 2013

HUMAN SYSTEMS

1. Figure shows schematic plan of blood circulation in humans with labels A to D. Identify the label and give its function/s.



   a) C-Vena Cava-takes blood from body parts to right auricle, PCO_2 = 45 mm Hg
   b) D-Dorsal aorta-takes blood from heart to body parts, PO_2 = 95 mm Hg
   c) A-Pulmonary vein – takes impure blood from body parts, PO_2 = 60 mm Hg
   d) B-Pulmonary artery – takes blood from heart to lungs, PO_2 = 90 mm Hg

Ans. (a)

2. Which of the following statements is correct in relation to the endocrine system?
   a) Non-nutrient chemicals produced by the body in trace amount that act as intercellular messenger are known as hormones.
   b) Releasing and inhibitory hormones are produced by the pituitary gland.
   c) Adenohypophysis is under direct neural regulation of the hypothalamus.
   d) Organs in the body like gastrointestinal tract, heart, kidney and liver do not produce any hormone.

Ans. (a)

3. What is the correct sequence of sperm formation?
   a) Spermatogonia, spermatozoa, spermatocyte, spermatid
   b) Spermatogonia, spermatocyte, spermatid, spermatozoa
   c) Spermatid, spermatocyte, spermatogonia. spermatozoa
   d) Spermatogonia, spermatocyte, spermatozoa, spermatid

Ans. (b)

4. Artificial insemination means:
   a) artificial introduction of sperms of a healthy donor into the vagina
   b) introduction of sperms of a healthy donor directly into the ovary.
   c) transfer of sperms of a healthy donor to a test tube containing ova
   d) transfer of sperms of husband to a test tube containing ova

Ans. (a)

5. Which one of the following is not the function of placenta? It:
   a) Facilitates removal of carbon dioxide and waste material from embryo.
   b) Secretes oxytocin during parturition.
   c) Facilitates supply of oxygen and nutrients to embryo.
   d) Secretes estrogen.

Ans. (b)

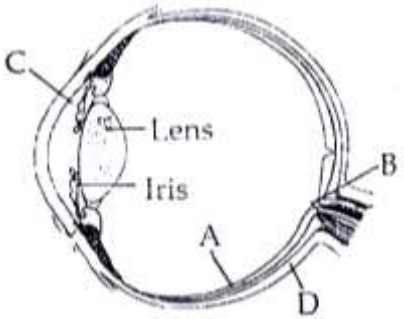
6. Select the correct statement with respect to locomotion in humans:
   a) The vertebral column has 10 thoracic vertebrae.
   b) The joint between adjacent vertebrae is a fibrous joint.
   c) A decreased level of progesterone causes osteoporosis in old people.
   d) Accumulation of uric acid crystals in joints causes their inflammation.

Ans. (d)

Hint:

   a) Wrong as vertebral coloumn has 12 thoracic vertebrae
   b) Wrong as joint between adjacent vertebrae is a Cartilagenous joint which permits limited movements.
   c) Wrong Osteoporosis is a decrease in bone mass due to a decreased level of estrogen and not progesterone in old age.
   d) Correct, as accumulation of uric acid crystals causes inflammation of joints called Gout.

7. Parts A, B, C and D of the human eye are shown in the diagram. Select the option which gives correct identification along with its functions/ characteristics:



a) C – Aqueous chamber –reflects the light which does not pass through the lens.
b) D – Choroid – its anterior part forms ciliary body.
c) A – Retina – contains photo receptors – rods and cones.
d) B- Blind spot – has only a few rods and cones.

Ans. (c)

8. Which of the following cannot be detected in a developing foetus by amniocentesis?
   a) Down syndrome b) Jaundice
   c) Klinefelter syndrome d) Sex of the foetus

Ans. (b)

9. The most abundant intracellular cation is:
   a) H^+ b) K^+
   c) Na^+ d) Ca^{++}

Ans. (b)

10. Select the correct match of the digested products in human given in **column I** with their absorption site and mechanism in **column II.**

	Column I	Column II
a)	Glycerol, fatty acids	Duodenum, move as chilomicrons
b)	Cholesterol, maltose	Large intestine, active absorption
c)	Glycine, glucose	Small intestine, active absorption
d)	Fructose, Na^+	Small intestine, passive absorption

Ans. (c)

11. If two persons with 'AB' blood group marry and have sufficiently large number of children, these children could be classified as 'A' blood group : 'AB' blood group: 'B' blood group in 1:2:1 ratio. Modern technique of protein electrophoresis reveals presence of both 'A' and 'B' type proteins in 'AB' blood group individuals. This is an example of:
   a) Partial dominance
   b) Complete dominance
   c) Codominance
   d) Incomplete dominance

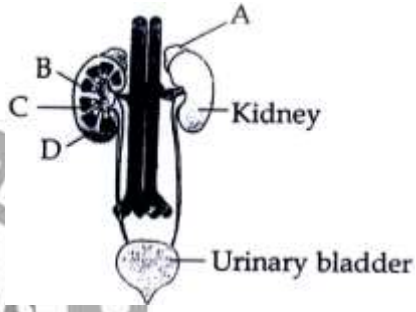
Ans. (c)

12. One of the legal methods of birth control is:
   a) by having coitus at the time of day break
   b) by a premature ejaculation during coitus
   c) abortion by taking an appropriate medicine
   d) by abstaining from coitus from day 10 to 17 of the menstrual cycle

Ans. (d)

Hint: Both the options (c) and (d) are correct. If it was asked which is the method for prevention of pregnancy / conception then abstinence would have been the only correct option.

13. Figure shows human urinary system with structures labelled A to D. Select option which correctly identifies them and gives their characteristics and/or functions.



a) C- Medulla – inner zone of kidney and contains complete nephrons.
b) D-Cortex-outer part of kidney and do not contain any part of nephrons.
c) A – Adrenal gland –located at the anterior part of kidney. Secrete Catecholamines which stimulate glycogen breakdown.
d) B-Pelvis-broad funnel shaped space inner to hilum, directly connected to loops of Henle.

Ans. (c)

Hint: The correct labelling of
A – Adrenal gland
B and C – Medullary pyramids / Medulla.
D – Cortex
(a) False; as medulla contains the loop of Nenle of nephrons; the malpighian corpuscle, PCT & DCT of nephron are situated in the cortex.
(b) False; as cortex contains the malpighian corpuscle, PCT and DCT.
(c) True; although adrenal gland is located super anterior to upper end of the kidney, but no other option is correct,

therefore we consider this statement to be correct.

(d) False; (B) is medullary Pyramid.

14. The H-zone in the skeletal muscle fibre is due to:
    a) The central gap between actin filaments extending through myosin filaments in the A-band
    b) Extension of myosin filaments in the central portion of the A –band.
    c) The absence of myofibrils in the central portion of A-band.
    d) The central gap between myosin filaments in the A-band.

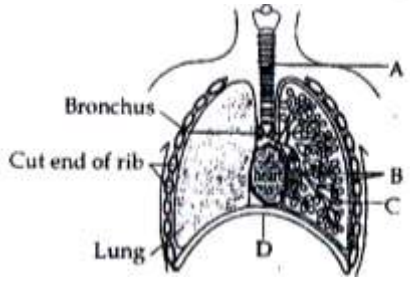
Ans. (a)

15. The characteristics and an example of a synovial joint in humans is:

	Characteristics	Examples
a)	fluid filled synovial cavity between two bones	joint between atlas and axis
b)	lymph filled between two bones, limited movement	gliding joint between carpals
c)	fluid cartilage between two bones, limited movements	Knee joint
d)	fluid filled between two joints, provides cushion	Skull bones

Ans. (a)

16. The figure shows a diagrammatic view of human respiratory system with labels A, B, C and D. Select the option which gives correct identification and main function and/ or characteristic.



    a) C- Alveoli – thin walled vascular bag like structures for exchange of gases.
    b) D – Lower end of lungs-diaphragm pulls it down during inspiration.
    c) A- trachea –long tube supported by complete cartilaginous rings for conducting inspired air.
    d) B-pleural membrane –surround ribs on both sides to provide cushion against rubbing.

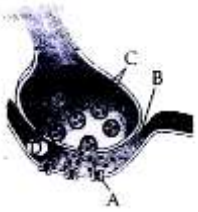
Ans. (a)

17. Select the answer which correctly matches the endocrine gland with the hormone it secretes and its function/ deficiency symptom:

	Endocrine gland	Hormone	Function/deficiency symptoms
a)	Thyroid gland	Thyroxine	Lack of iodine in diet results in goitre
b)	Corpus luteum	Testosterone	Stimulates spermatogenesis
c)	Anterior pituitary	Oxytocin	Stimulate uterus contraction during child birth
d)	Posterior pituitary	Growth Hormone (GH)	Oversecretion stimulates abnormal growth

Ans. (a)

18. A diagram showing axon terminal and synapse is given. Identify correctly at least two of A-D.



    a) A- Neurotransmitter
       B-Synaptic cleft
    b) C-Neurotransmitter
       D-Ca^{++}
    c) A – Receptor
       C-Synaptic vesicles
    d) B-Synaptic connection
       D – K^{+}

Ans. (c)

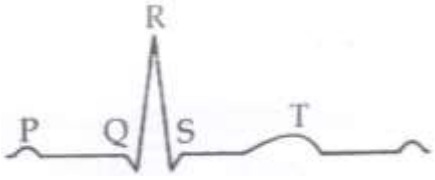
19. Product of sexual reproduction generally generates:
    a) New genetic combination leading to variation
    b) Large biomass
    c) Longer viability of seeds
    d) Prolonged dormancy

Ans. (a)

20. Menstrual flow occurs due to lack of:
    a) Oxytocin b) Vasopressin
    c) Progesterone d) FSH

Ans. (c)

21. The diagram given here is the standard ECG of a normal person. The P-wave represents the:



a) Beginning of the systole
b) End of systole
c) Contraction of both the atria
d) Initiation of the ventricular contraction

Ans. (c)

Hint: Both the options (a) and (c), are correct.

P wave represents atrial depolarisation ie, atrial systole (contraction of atria). Cardiac cycle consists of first systole of heart followed by diastole. Cardiac systole consists of fist atrial systole, followed by ventricular systole. Thus beginning of systole of heart is represented by atrial systole which is further respresented by the P wave.

GENETICS

22. If both parents are carriers for thalessemia, which is an autosomal recessive disorder, what are the chances of pregnancy resulting in an affected child?
    a) 25% b) 100%
    c) no chance d) 50%

Ans. (a)

23. Which Mendelian idea is depicted by a cross in which the F_1 generation resembles both the parents?
    a) inheritance of one gene
    b) co-dominance
    c) incomplete dominance
    d) law of dominance

Ans. (b)

24. The incorrect statement with regard to Haemophilia is:
    a) It is a dominant disease
    b) A single protein involved in the clotting of blood is affected
    c) It is a sex-linked disease
    d) It is a recessive disease

Ans. (a)

25. Which enzyme/s will be produced in a cell in which there is a nonsense mutation in the lac Y gene?
    a) Transacetylase
    b) Lactose permease and transacetylase
    c) β - galactosidase
    d) Lactose permease

Ans. (c)

Hint: In the lac – operon; there are three structural genes – Z; 'y' and 'a'. They are translated in sequence (*i.e.,* first Z then y then a). If there is a non sense mutation in the 'y' gene, then only Z will get translated and y and a will not get translated. Therefore only the enzyme coded by Z (*i.e.,* β galactosidase) will be produced. The other two enzymes (*i.e.,* 'y' coding for) Permease and ('a' coding for) transacetylase will not be produced.

26. The diagram shows an important concept in the genetic implication of DNA. Fill in the blanks A to C.

$$DNA \xrightarrow{A} mRNA \xrightarrow{B} Protein \xrightarrow[C]{\text{Proposed by}}$$

    a) A – transcription B – translation C – Francis Crick
    b) A – translation B – extension C – Rosalind Franklin
    c) A – transcription B – replication C –James Watson
    d) A- translation B – transcription C – Erevin Chargaff

Ans. (a)

27. Which of the following statements is **not** true of two genes that show 50% recombination frequency?
    a) The genes show independent assortment
    b) If the genes are present on the same chromosome, they undergo more than one crossovers in every meiosis
    c) The genes may be on different chromosomes
    d) The genes are tightly linked

Ans. (d)

Hint: If two genes show a 50% recombination frequency it means that they are not linked and show independent assortment. They may be on the same chromosome or are more likely to be on different chromosomes. If they are on the same chromosome then the distance between then is large *i.e.,* nearly 50cm. We know that larger the distance between genes on the same chromosome greater are the chances of more than one cross overs in meiosis.

CYTOLOGY

28. The complex formed by a pair of synapsed homologous chromosomes is called:
    a) Bivalent b) Axoneme
    c) Equatorial plate d) Kinetochore

Ans. (a)

29. The Golgi complex plays a major role:
    a) as energy transferring organelles
    b) in post translational modification of proteins and glycosidation of lipids
    c) in trapping the light and transforming it into chemical energy
    d) in digesting proteins and carbohydrates

Ans. (b)

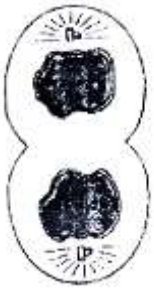
30. The essential chemical components of many coenzymes are:
    a) Carbohydrates b) Vitamins
    c) Proteins d) Nucleic acids

Ans. (b)

31. Macro molecule chitin is:
    a) Sulphur containing polysaccharide
    b) simple polysaccharide
    c) nitrogen containing polysaccharide
    d) phosphorus containing polysaccharide

Ans. (c)

32. A stage in cell division is shown in the figure. Select the answer which gives correct identification of the stage with its characteristics.



a)	Cytokinesis	cell plate formed, mitochondria distributed between two daughter cells.
b)	Telophase	endoplasmic reticulum and nucleolus not reformed yet.
c)	Telophase	nuclear envelop reforms, golgi complex reforms.
d)	Late anaphase	chromosomes move away from equatorial plate, golgi complex not present.

Ans. (c)

33. Which one of the following organelle in the figure correctly matches with its function?

    a) Golgi apparatus, formation of glycolipids
    b) Rough endoplasmic reticulum, protein synthesis
    c) Rough endoplasmic reticulum, formation of glycorproteins
    d) Golgi apparatus, protein synthesis

Ans. (b)

34. A phosphoglyceride is always made up of:
    a) a saturated or unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached
    b) a saturated or unsaturated fatty acid esterified to a phosphate group which is also attached to a glycerol molecule
    c) only a saturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached
    d) only an unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached

Ans. (a)

35. A major site for synthesis of lipids is:
    a) Symplast b) Nucleoplasm
    c) RER d) SER

Ans. (d)

36. Pigment-containing membranous extensions in some cyanobacteria are:
    a) Pneumatophores b) Chromatophores
    c) Heterocysts d) Basal bodies

Ans. (b)

37. Transition state structure of the substrate formed during an enzymatic reaction is:
    a) transient and unstable
    b) permanent and stable
    c) transient but stable
    d) permanent but unstable

Ans. (a)

PLANT PHYSIOLOGY

38. Meiosis takes place in:
    a) Gemmule b) Megaspore
    c) Meiocyte d) Conidia

Ans. (c)

39. The first stable product of fixation of atmospheric nitrogen in leguminous plants is:
    a) NO_3^- b) Glutamate
    c) NO_2^- d) Ammonia

Ans. (d)

40. Perisperm differs from endosperm in :
    a) Being a diploid tissue
    b) Its formation by fusion of secondary nucleus with several sperms
    c) Being a haploid tissue
    d) Having no reserve food

Ans. (a)

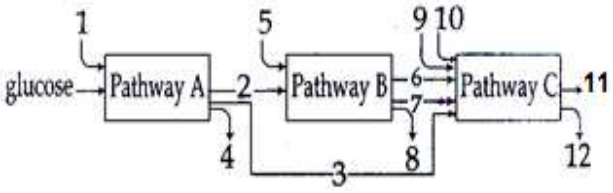
41. Which of the metabolites is common to respiration-mediated breakdown of fats, carbohydrates and proteins?
    a) Pyruvic acid
    b) Acetyl CoA
    c) Glucose – 6 –phosphate
    d) Fructose 1, 6 –bisphosphate

Ans. (b)

42. Monoecious plant of Chara shows occurrence of:
    a) Upper antheridium and lower oogonium on the same plant
    b) Upper oogonium and lower antheridium on the same plant
    c) Antheridiophore and archegoniophore on the same plant
    d) Stamen and carpel on the same plant

Ans. (b)

43. The three boxes in this diagram represent the three major biosynthetic pathways in aerobic respiration. Arrows represent net reactants or products.



Arrows numbered 4, 8 and 12 can all be:
    a) H_2O b) FAD^+ or $FADH_2$
    c) NADH d) ATP

Ans. (d)

Hint:

- **Pathway A represents Glycolysis; B is Kreb's cycle and C is ETC.**
- **ATP is produced in all these three pathways (represented by 4, 8, 12).**
- **NADH is produced in pathway A and B, not in C**
- **$FADH_2$ is produced only in pathway B.**
- **H_2O is produced in A & C, not in Kreb's cycle.**

44. During seed germination its stored food is mobilized by:
    a) ABA b) Gibberellin
    c) Ethylene d) Cytokinin

Ans. (b)

45. Advantage of cleistogamy is:
    a) No dependence on pollinators
    b) Vivipary
    c) Higher genetic variability
    d) More vigorous offspring

Ans. (a)

46. Megasporangium is equivalent to;
    a) Nucellus b) Ovule
    c) Embryo sac d) Fruit

Ans. (b)

Hint: Both options (a) and (b) are correct as NCERT itself equates megasporangium to both ovule and nucellus.

47. Which one of the following statements is correct?
    a) Endothecium produces the microspores
    b) Tapetum nourishes the developing pollen
    c) Hard outer layer of pollen is called intine
    d) Sporogenous tissue is haploid

Ans. (b)

48. Which of the following criteria **does not** pertain to facilitated transport?
    a) Transport saturation
    b) Uphill transport
    c) Requirement of special membrane proteins
    d) High selectivity

Ans. (b)

PLANT MORPHOLOGY

49. Among bitter gourd, mustard, brinjal, pumpkin, china rose, lupin, cucumber, sunnhemp, gram, guava, bean, chilli, plum, petunia, tomato, rose, withania, potato, onion, aloe and tulip how many plants have Hypogynous flower?
    a) Fifteen b) Eighteen
    c) Six d) Ten

Ans. (a)

Hint: Fabaceae, Solanaceae; Brassicaceae; Malvaceae and Liliaceae all show hypogynous flower (*i.e.,* superior ovary).

1. **Mustard (Brassicaceae)**
2. **Brinjal (Solanacae)**
3. **Chinarose (Malvaceae)**
4. **Lupin (Fabaceae)**
5. **Sunhemp (Fabaceae)**
6. **Gram (Fabaceae)**
7. **Bean (Fabaceae)**
8. **Chilli (Solanaceae)**
9. **Petunia (Solanaceae)**
10. **Tomato (Solanaceae)**
11. **Withania (Solanaceae)**
12. **Potato (Solanaceae)**
13. **Onion (Liliaceae)**
14. **Aloe (Liliaceae)**
15. **Tulip (Liliaceae)**

- **Guava cucumber, Bitter gourd, Pumpkin have inferior ovary.**
- **Plum, Rose and Peach have half inferior ovary.**

50. In china rose the flowers are:
    a) Zygomorphic, hypogynous with Imbricate aestivation
    b) Zygomorphic, epigynous with twisted aestivation
    c) Actinomorphic, hypogynous with twisted aestivation
    d) Actinomorphic, epigynous with valvate aestivation

Ans. (c)

51. Seed coat is not thin, membranous in
    a) Groundnut b) Gram
    c) Maize d) Coconut

Ans. (b)

PLANT ANATOMY

52. Lenticels are involved in:
    a) Food transport b) Photosynthesis
    c) Transpiration d) Gaseous exchange

Ans. (d)

Hint: Lenticels Perform both gaseous exchange and transpiration. If it was asked what is the main function of lenticels then gaseous exchange would have been the best answer.

53. Interfascicular cambium develops from the cells of :
    a) Endodermis b) Pericycle
    c) Medullary rays d) Xylem parenchyma

Ans. (c)

54. Age of a tree can be estimated by:
    a) number of annual rings
    b) diameter of its heartwood
    c) its height and girth
    d) biomass

Ans. (a)

ANIMAL MORPHOLOGY

55. What external changes are visible after the last moult of a cockroach nymph?
    a) Both fore wings and hind wings develop
    b) Labium develops
    c) Mandibles become harder
    d) Anal cerci develops

Ans. (a)

EVOLUTION

56. According to Darwin, the organic evolution is due to:
    a) Competition within closely related species.
    b) Reduced feeding efficiency in one species due to the presence of interfering species.
    c) Intraspecific competition
    d) Interspecific competition.

Ans. (a), (c) & (d)

Hint: According to Darwin Organic evolution is due to both interspecific and intraspecific competition.

Moreover Competition between closely related species, means Interspecific competition Thus options (a), (c) and (d) are all correct. CBSE has also taken all these three options as correct options.

57. The tendency of population to remain in genetic equilibrium may be disturbed by:
    a) lack of mutations
    b) lack of random mating
    c) random mating
    d) lack of migration

Ans. (b)

58. Variation in gene frequencies within populations can occur by chance rather than by natural selection.
    This is referred to as:
    a) Random mating b) Genetic load
    c) Genetic flow d) Genetic drift

Ans. (d)

59. The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge, is called:
    a) Non-random evolution
    b) Adaptive radiation
    c) Natural selection
    d) Convergent evolution

Ans. (d)

60. The eye of octopus and eye of cat show different patterns of structure, yet they perform similar function. This is an example of:
    a) Analogous organs that have evolved due to convergent evolution.
    b) Analogous organs that have evolved due to divergent evolution.
    c) Homologous organs that have evolved due to convergent evolution.
    d) Homologous organs that have evolved due to divergent evolution.

Ans. (a)

64. A good producer of citric acid is:
    a) *Clostridium* b) *Saccharomyces*
    c) *Aspergillus* d) *Pseudomonas*

Ans. (c)

65. The cell-mediated immunity inside the human body is carried out by:
    a) Thrombocytes b) Erythrocytes
    c) T-lymphocytes d) B-lymphocytes

Ans. (c)

66. During sewage treatment, biogases are produced which include:
    a) hydrogensulphide, methane, sulphur dioxide
    b) hydrogensulphide, nitrogen, methane
    c) methane, hydrogensulphide, Carbon dioxide
    d) methane, oxygen, hydrogensulphide

Ans. (c)

BIOLOGY IN HUMAN WELFARE

61. A pregnant female delivers a baby who suffers from stunted growth, mental retardation, low intelligence quotient and abnormal skin. This is the result of;
    a) Cancer of the thyroid gland
    b) Over secretion of pars distalis
    c) Deficiency of iodine in diet
    d) Low secretion of growth hormone

Ans. (c)

62. Infection of *Ascaris* usually occurs by:
    a) Tse-tse fly.
    b) mosquito bite.
    c) drinking water containing eggs of *Ascaris.*
    d) eating imperfectly cooked pork.

Ans. (c)

63. In plant breeding programmes, the entire collection (of plants/seeds) having all the diverse alleles for all genes in a given crop is called;
    a) evaluation and selection of parents
    b) germplasm collection.
    c) Selection of superior recombinants.
    d) Cross-hybridisation among the selected parents.

Ans. (b)

BIOTECHNOLOGY

67. Which of the following Bt crops is being grown in India by the farmers?
    a) Brinjal b) Soybean
    c) Maize d) Cotton

Ans. (d)

68. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of:
    a) Insertional inactivation of alphagalactosidase in recombinant bacteria
    b) Inactivation of glycosidase enzyme in recombinant bacteria
    c) Non-recombinant bacteria containing beta-galactosidase
    d) Insertional inactivation of alphagalactosidase in non-recombinant bacteria

Ans. CBSE has given the answer (a) but the correct answer is (c) as per NCERT.

Hint: In insertional inactivation a recombinant DNA is inserted within the coding sequence of enzyme β – galactosidase. If the plasmid in the bacteria does not have the insert (*i.e.*, non – recombinants) then the chromogenic substrate gives blue coloured colonies. Presence of the insert (*i.e.*, recombinants) leads to inactivation of the β-galactosidase enzyme thus the colonies do not produce any colour.

Option:

- **Option (a) is wrong, it should be β galactosidase**
- **Option (b) is wrong, it should be galactosidase instead of glycosidase**
- **Option (c) is correct, as the non-recombinants have the β galactosidase enzymes intact.**
- **Option (d) is wrong it should be "Insertional inactivation of β galactosidase of recombinant bacteria".**

69. DNA fragments generated by the restriction endonucleases in a chemical reaction can be separated by:
    a) Electrophoresis
    b) Restriction mapping
    c) Centrifugation
    d) Polymerase chain reaction

Ans. (a)

70. Which of the following is **not** correctly matched for the organism and its cell wall degrading enzyme?
    a) Algae – Methylase
    b) Fungi – Chitinase
    c) Bacteria – Lysozyme
    d) Plant cells – Cellulase

Ans. (a)

ECOLOGY

71. Natural reservoir of phosphorus is:
    a) Rock b) Fossils
    c) Sea water d) Animal bones

Ans. (a)

72. Secondary productivity is rate of formation of new organic matter by:
    a) Consumer b) Decomposer
    c) Producer d) Parasite

Ans. (a)

73. Which one of the following is not used for *ex situ* plant conservation?
    a) Shifting cultivation b) Botanical Gardens
    c) Field gene banks d) Seed banks

Ans. (a)

74. A sedentary sea anemone gets attached to the shell lining of hermit crab. The association is:
    a) Commensalism b) Amensalism
    c) Ectoparasitism d) Symbiosis

Ans. (a)

Hint: Some authors have called this association Mutualism (Symbiosis), some called it Protocooperation while some others say it is Commensalism. Thus (a) and (d) are both correct.

75. Kyoto Protocol was endorsed at:
    a) CoP – 6 b) CoP - 4
    c) CoP – 3 d) CoP – 5

Ans. (c)

Hint: Cop stands for conference of Parties which is the governing body of the convention on Biological Diversity and advances implementation of the convention through the decisions it takes at its periodic meetings. Till date it has held 11 major meetings.

The kyotoprotocol was adopted at the third session of the conference of parties in 1997 in Kyoto, Japan.

76. A biologist studied the population of rats in a barn. He found that the average natality was 250, average mortality 240, immigration 20 and emigration 30. The net increase in population is:
    a) 05 b) zero c) 10 d) 15

Ans. (b)

77. Global warming can be controlled by:
    a) Increasing deforestation, slowing down the growth of human population.
    b) Increasing deforestation, reducing efficiency of energy usage.
    c) Reducing deforestation, cutting down use of fossil fuel.
    d) Reducing reforestation, increasing the use of fossil fuel.

Ans. (c)

78. Which one of the following processes during decomposition is correctly described?
    a) Catabolism – Last step in the decomposition under fully anaerobic condition
    b) Leaching – Water soluble inorganic nutrients rise to the top layers of soil.
    c) Fragmentation – Carried out by organism such as earthworm
    d) Humification – Leads to the accumulation of a dark coloured substance humus which undergoes microbial action at a very fast rate.

Ans. (c)

Hint:

a) False, All the three processes *i.e.,* Fragmentation, leaching and catabolism operate simultaneously and is followed by humification and Mineralisation. The process of decomposition is largely an oxygen requiring process.

b) False; Leaching is the moving down of water soluble inorganic nutrients into the soil horizon.
c) True
d) False; Humus is highly resistant to microbial action and gets decomposed at a very slow rate.

79. The Air Prevention and Control of Pollution Act came into force in:
a) 1985 b) 1990
c) 1975 d) 1981
Ans. (d)

ANIMAL KINGDOM

80. Which of the following are correctly matched with respect to their taxonomic classification?
a) House fly, butterfly, tsetsefly, silverfish- Insecta
b) Spiny anteater, sea urchin, sea cucumber- Echinodermata
c) Flying fish, cuttlefish, silverfish – Pisces
d) Centipede, millipede, spider, scorpion- Insecta
Ans. (a)
Hint:
- **In option (a) all the given examples belong to class Insecta (of phylum Arthropoda).**
- **In option (b) spiny anteater belongs to phylum chordata (class Mammalia); while sea urchin and sea cucumber belong to Echinodermata**
- **In option (c) Flying fish belongs to Picses, while cuttle fish belongs to mollusca and silver fish belongs to insecta.**
- **In option (d) All belong to Phylum Arthropoda but further belong to different classes of Arthropoda Centipede (Chilopoda); Millipede (Diplopoda); Spider and Scorpion (Arachnida).**

81. Which group of animals belong to the same phylum?
a) Prawn, Scorpion, *Locusta*
b) Sponge, Sea anemone, Starfish
c) Malarial parasite, *Amoeba*, Mosquito
d) Earthworm, Pinworm, Tapeworm
Ans. (a)
Hint:
a) Prawn, Scorpion and Locusta all belong to Arthropoda.
b) Sponge (Porifera); Sea anemone (Coelenterata) and starfish (Echinodermata)
c) Malarial Parasite (Protista); Amoeba (Protista); Mosquito (Arthropoda)
d) Earthworm (Annelida); Pinworm (Aschelminthes / Nematoda); Tapeworm (Platyhelminthes)

82. Match the name of the animal (column I), with one characteristics (column II), and the phylum/ class (column III) to which it belongs:

	Column I	Column II	Column III
a)	Limulus	body covered by chitinous exoskeleton	Pisces
b)	Adamsia	radially symmetrical	Porifera
c)	Petromyzon	ectoparasite	Cyclostomata
d)	Ichthyophis	terrestrial	Reptilia

Ans. (c)
Hint: (a) Wrong; Limulus is King Crab and belongs to Arthropoda.
(b) Wrong; Adamsia is sea Anemone and belongs to Coelenterata
(c) Correct; Petromyzon is Lamprey.
(d) Ichthyophis is Limbless Amphibian.

83. One of the representatives of Phylum Arthropoda is:
a) pufferfish b) flying fish
c) cuttlefish d) silverfish
Ans. (d)

PLANT KINGDOM

84. Besides paddy fields, cyanobacteria are also found inside vegetative part of:
a) *Equisetum* b) *Psilotum*
c) *Pinus* d) *Cycas*
Ans. (d)

85. Select the wrong statement:
a) In Oomycetes female gamete is smaller and motile, while male gamete is larger and non-motile
b) *Chlamydomonas* exhibits both isogamy and anisogamy and *Fucus* shows oogamy
c) Isogametes are similar in structure, function and behaviour
d) Anisogametes differ either in structure, function or behaviour
Ans. (a)
Hint: Oomycetes show oogamy where there is fusion between one large, non motile static female gamete and a smaller, motile male gamete.

86. Isogamous condition with non–flagellated gametes is found in:
    a) *Volvox* b) *Fucus*
    c) *Chlamydomonas* d) *Spirogyra*

Ans. (d)

Hint:

- **Spirogyra has non-flagellated isogamous gametes.**
- **Chlamydomonas has flagellated isogamous or anisogamous gametes in different species**
- **Fucus and Volvox show oogamy.**

87. Which of the following represent maximum number of species among global biodiversity?
    a) Fungi b) Mosses and Ferns
    c) Algae d) Lichens

Ans. (a)

88. Read the following statements (A-E) and answer the question which follows them.
    (i) In liverworts, mosses, and ferns gametophytes are free-living
    (ii) Gymnosperms and some ferns are heterosporous
    (iii) Sexual reproduction in *Fucus, Volvox* and *Albugo* is oogamous
    (iv) The sporophyte in liverworts is more elaborate than that in mosses
    (v) Both, *Pinus* and *Marchantia* are dioecious
    How many of the above statements are correct?
    a) Three b) Four c) One d) Two

Ans. (a) ; Statements A) , B) & C) are true.

Hint:

(i) True, In liverworts and mosses the dominant generation is gametophyte in ferns the gametophyte although not the dominant generation it is free living, autotrophic.

(ii) True; Gymnosperms are heterosporous and some ferns (eg-selaginella & salvinia) are also heterosporous.

(iii) True; Fucus (Brown alga) and Volvox (green alga) are both oogamous algae. Albugo is a fungus belonging to Oomycetes/ Phycomycetes which too shows oogamy.

(iv) False; Actually the sporophyte of Mosses is more elaborate than of Liverworts.

(v) False; Cycas is Dioecious and Pinus is Monoecious.

MONERA

89. Which of the following are likely to be present in deep sea water?
    a) Blue-green algae
    b) Saprophytic fungi
    c) Archaebacteria
    d) Eubacteria

Ans. (c)

PROTISTA - NIL

FUNGI - NIL

SYSTEMATICS

90. Which one of the following is not a correct statement?
    a) A museum has collection of photographs of plants and animals
    b) Key is a taxonomic aid for identification of specimens
    c) Herbarium houses dried, pressed and preserved plant specimens
    d) Botanical gardens have collection of living plants for reference

Ans. (a)

Hint: A museum has a collection of preserved plant and animal specimens for study and reference.