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PRESENT

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Maximum Marks: 720 **Time : 3 Hours**

Paper Code
Y

NEET (UG) – 2013

Important Instructions:

1. The test is of 3 hours duration and this Test Booklet contains 180 questions. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total scores. The maximum marks are 720.
2. Use Blue / Black Ballpoint Pen only for writing particulars on this page/marking responses.
3. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
4. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room / Hall. The candidates are allowed to take away this Test Booklet with them.
5. The CODE for this Booklet is KK.
6. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
7. Each candidate must show on demand his/her Admission Card to the Invigilator.
8. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.
9. Use of Electronic/Manual Calculator is prohibited.
10. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of this examination.
11. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
12. The candidates will write the Correct Test Booklet Code as given in the Test Booklet / Answer Sheet in the Attendance Sheet.

SECTION - I (BIOLOGY) 360 MARKS

1. The eye of octopus and eye of cat show different patterns of structure, yet they perform similar function. This is an example of:
- **(1)** Analogous organs that have evolved due to divergent evolution
- **(2)** Homologous organs that have evolved due to convergent evolution
- **(3)** Homologous organs that have evolved due to divergent evolution
- **(4)** Analogous organs that have evolved due to convergent evolution

2. Select the correct statement with respect to locomotion in humans:
- **(1)** The joint between adjacent vertebrae is a fibrous joint
- **(2)** A decreased level of progesterone causes osteoporosis in old people
- **(3)** Accumulation of uric acid crystals in joints causes their inflammation
- **(4)** The vertebral column has 10 thoracic vertebrae

3. A phosphologlyceride is always made up of:
- **(1)** a saturated or unsaturated fatty acid esterified to a phosphate group which is also attached to a glycerol molecule
- **(2)** only a saturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached
- **(3)** only an unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached
- **(4)** a saturated or unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached

4. Perisperm differs from endosperm in:
- **(1)** its formation by fusion of secondary nucleus with several sperms
- **(2)** being haploid tissue
- **(3)** having no reserve food
- **(4)** being a diploid tissue

5. A sedentary sea anemone gets attached to the shell lining of hermit crab. The association is:
(1) Amensalism **(2)** Ectoparasitism **(3)** Symbiosis **(4)** Commensalism

6. The cell-meidated immunity inside the human body is carried out by:
(1) Erythrocytes **(2)** T– lymphocytes **(3)** B – lymphocytes **(4)** Thromobcytes

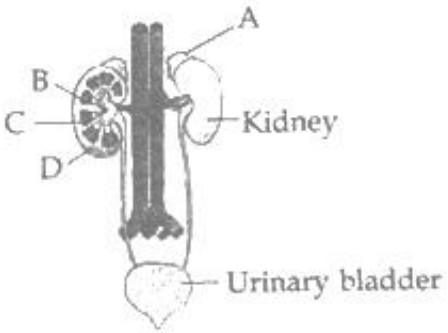
7. Which of the following are likely to be present in deep sea water?
- **(1)** Saprophytic fungi
- **(2)** Archaebacteria
- **(3)** Eubacteria
- **(4)** Blue-green algae

8. One of the representatives of Phylum Arthropoda is:
(1) flying fish **(2)** cuttlefish **(3)** silverfish **(4)** pufferfish

9. Megasporangium is equivalent to:
(1) Ovule **(2)** Embryo sac **(3)** Fruit **(4)** Nucellus

10. Kyoto Protocol was endorsed at:
(1) CoP– 4 **(2)** CoP– 3 **(3)** CoP– 5 **(4)** CoP– 6

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



(1) D – Cortex –outer part of kidney and do not contain any part of nephrons

(2) A– Adrenal gland – located at the anterior part of kidney. Secrete Catecholamines which stimulate glycogen breakdown

(3) B – Pelvis – broad funnel shaped space inner to hilum, directly connected to loops of Henle

(4) C – Medulla – inner zone of kidney and contains complete nephrons

12. In china rose the flowers are:

(1) Zygomorphic, epigynous with twisted aestivation

(2) Actinomorphic, hypogynous with twisted aestivation

(3) Actinomorphic, epigynous with valvate aestivation

(4) Zygomorphic, hypogynous with imbricate aestivation

13. The Golgi complex plays a major role:

(1) in post translational modification of proteins and glycosidation of lipids

(2) in trapping the light and transforming it into chemical energy

(3) in digesting proteins and carbohydrates **(4)** as energy transferring organelles

14. What external changes are visible after the last moult of a cockroach nymph?

(1) Labium develops **(2)** Mandibles become harder

(3) Anal cerci develop **(4)** Both fore wings and hind wings develop

15. Isogamous condition with non-flagellated gametes is found in

(1) *Fucus* **(2)** *Chlamydomonas* **(3)** *Spirogyra* **(4)** *Volvox*

16. Transition state structure of the substrate formed during an enzymatic reaction is:

(1) permanent and stable **(2)** transient but stable

(3) permanent but unstable **(4)** transient and unstable

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**
(1)	Corpus luteum	Testosterone	Stimulates spermatogenesis
(2)	Anterior pituitary	Oxytocin	Stimulates uterus contraction during child birth
(3)	Posterior pituitary	Growth Hormone (GH)	Oversecretion stimulates abnormal growth
(4)	Thyroid gland	Thyroxine	Lack of iodine in diet results in goitre

18. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of:

(1) Inactivation of glycosidase enzyme in recombinant bacteria
(2) Non-recombinant bacteria containing beta-galactosidase
(3) Insertional inactivation of alpha-galactosidase in non-recombinant bacteria
(4) Insertional inactivation of alpha-galactosidase in recombinant bacteria

19. Monoecious plant of *Chara* shows occurrence of:

(1) upperoogonium and lower antheridium on the same plant
(2) antheriodiophore and archegoniophore on the same plant
(3) stamen and carpel on the same plant
(4) upper antheridium and lower oogonium on the same plant

20. Advantage of cleistogamy is:

(1) Vivipary **(2)** Higher genetic variability
(3) More vigorous offspring **(4)** No dependence on pollinators

21. The H-zone in the skeletal muscle fibre is due to:

(1) extension of myosin filaments in the central portion of the A – band
(2) the absence of myofibrils in the central portion of A – band
(3) the central gap between myosin filaments in the A – band
(4) the central gap between actin filaments extending through myosin filaments in the A – band

22. Artificial insemination means:

(1) introduction of sperms of a healthy donor directly into the ovary
(2) transfer of sperms of a healthy donor to a test tube containing ova
(3) transfer of sperms of husband to a test tube containing ova
(4) artificial introduction of sperms of a healthy donor into the vagina

23. Which group of animals belong to the same phylum?

(1) Sponge, Sea anemone, Starfish **(2)** Malarial parasite, *Amoeba,* Mosquito
(3) Earthworm, Pinworm, Tapeworm **(4)** Prawn, Scorpion, *Locusta*

24. Seed coat is not thin, membranous in:

(1) Gram **(2)** Maize **(3)** Coconut **(4)** Groundnut

25. 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:

(1) Complete dominance **(2)** Codominance
(3) Incomplete dominance **(4)** Partial dominance

26. Which of the following **cannot** be detected in a developing foetus by amniocentesis?

(1) Jaudice **(2)** Klinefelter syndrome
(3) Sex of the foetus **(4)** Down syndrome

27. The first stable product of fixation of atmospheric nitrogen in leguminous plants is:

(1) Glutamate **(2)** NO_2^- **(3)** Ammonia **(4)** NO_3^-

28. 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:

(1) zero **(2)** 10 **(3)** 15 **(4)** 05

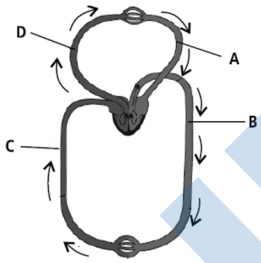
29. Secondary productivity is rate of formation of new organic matter by:

(1) Decomposer **(2)** Producer **(3)** Parasite **(4)** Consumer

30. Infection of *Ascaris* usually occurs by:

(1) mosquito bite **(2)** drinking water containing eggs of *Ascaris*
(3) eating imperfectly cooked pork **(4)** Tse-tse fly

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

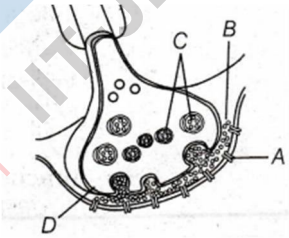


(1) D – Dorsal aorta – takes blood from heart to body parts, PO_2 = 95 mm Hg
(2) A – Pulmonary vein – takes impure blood form body parts, PO_2 = 60 mm Hg
(3) B – Pulmonary artery – takes blood from heart to lungs, PO_2 = 90 mm Hg
(4) C – Vena Cava – takes blood form body parts to right auricle, PO_2 = 45 mm Hg

32. The tendency of population to remain in genetic equilibrium may be disturbed by :

(1) lack of random mating **(2)** random mating
(3) lack of migration **(4)** lack of mutations

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



(1) C – Neurotransmitter
D – Ca^{++}
(2) A – Receptor
C –Synpatic vesicles
(3) B – Synaptic connection
D – K^{++}
(4) A – Neurotransmitter
B – Synaptic cleft

34. A good producer of citric acid is:

(1) *Saccharomyces* **(2)** *Aspergillus*
(3) *Pseudomonas* **(4)** *Clostridium*

35. Age of a tree can be estimated by:

(1) diameter of its heartwood
(2) its height and girth
(3) biomass
(4) number of annual rings

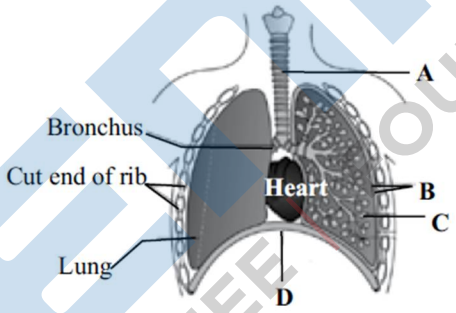
36. The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge, is called:

(1) Adaptive radiation
(2) Natural selection
(3) Convergent evolution
(4) Non-random evolution

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

(1) Telophase – Endoplasmic reticulum and nucleolus not reformed yet.
(2) Telophase – Nuclear envelop reforms
(3) Late anaphase – Chromosomes move away from equatorial plate, golgi complex not present
(4) Cytokinesis – Cell plate formed, mitochondria distributed between two daughter cells.

38. 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 characteristics.



(1) D – lower end of lungs – diaphragm pulls it down during inspiration
(2) A – trachea – long tube supported by complete cartilaginous rings for conducting inspired air
(3) B – pleural membrane –surround ribs on both sides to provide cushion against rubbing
(4) C – Alveoli – thin walled vascular bag like structures for exchange of gases

39. Interfascicular cambium develops from the cells of:

(1) Pericycle
(2) Medullary cycle
(3) Xylem parenchyma
(4) Endodermis

40. During seed germination its stored food is mobilized by:

(1) Gibberllin (2) Ethylene (3) Cytokinin (4) ABA

41. Meiosis takes place in:

(1) Megaspore (2) Meiocyte (3) Conidia (4) Gemmule

42. According to Darwin, the organic evolution is due to:
(1) Reduced feeding efficiency in one species due to the presence of interfering species
(2) Intraspecific competition **(3)** Interspecific competition
(4) Competition within closely related species

43. Which of the following criteria does not pertain to facilitated transport?
(1) Uphill transport **(2)** Requirement of special membrane proteins
(3) High selectivity **(4)** Transport saturation

44. A major site for synthesis of lipids is:
(1) Nucleoplasm **(2)** RER **(3)** SER **(4)** Symplast

45. Natural reservoir of phosphorous is:
(1) Fossils **(2)** Sea water **(3)** Animal bodies **(4)** Rock

46. Which of the metabolites is common to respiration mediated breakdown of fats, carbohydrates and proteins?
(1) Acetyl CoA **(2)** Glucose – 6 – phosphate
(3) Fructose 1, 6-biphosphate **(3)** Pyruvic acid

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

48. If both parents are carriers for thalassemia which is an autosomal recessive disorder, what are the chances of pregnancy resulting in an effected child?
(1) 100% **(2)** no chance **(3)** 50% **(4)** 25%.

49. Which of the following statements in not true of two genes that show 50% recombination frequency?
(1) If the genes are present on the same chromosome, they undergo more than one cross overs in every meiosis.
(2) The genes may be on different chromosomes
(3) The genes are tightly linked **(4)** The genes show independent assortment

50. One of the legal methods of birth control is:
(1) by a premature ejaculation during coitus
(2) abortion by taking an appropriate medicine
(3) by abstaining from coitus from day 10 to 17 of the menstrual cycle
(4) by having coitus at the time of day break.

51. Besides paddy fields, cyanobacteria are also found inside vegetative part of:
(1) *Psilotum* **(2)** *Pinus* **(3)** *Cycas* **(4)** *Equisetum*.

52. Which of the following are correctly matched with respect to their taxonomic classification?
(1) Spiny anteater, sea urchin, sea cucumber Echinodermata
(2) Flying fish, cuttlefish, silverfish-Pisces.
(3) Centipede, millipede, spider, scorpion-Insecta
(4) House fly, butterfly, tsetsefly, silverfish Insecta.

53. Variation in gene frequencies within propulations can occur by chance rather than by natural selection. This is referred to as:

(1) Genetic load **(2)** Genetic flow **(3)** Genetic drift **(4)** Random mating.

54. Select the correct match of the digested products in humans given in **Colum I** with their absorption site and mechanism in **Column II**.

	Column I	**Column II**
(1)	Cholesterol, maltose	large intestine, active absorption
(2)	Glycine, glucose	small intestine, active absorption
(3)	Fructose, Na^+	small intestine, passive absorption
(4)	Glycerol, fatty acids	duodenum, move as chylomicrons

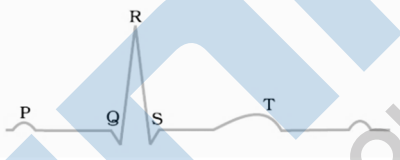
55. Select the **wrong** statement:

(1) *Chlamydomonas* exhibits both isogamy and anisogamy and *Fucus* shows oogamy
(2) Isogametes are similar in structure function and behavior
(3) Anisogametes differ either in structure, function or behavior
(4) In Oomycetes female gamete is smaller and motile, while male gamete is larger and non-motile.

56. Which Mendelian idea is depicted by a cross in which the F_1 generation resembles both the parents?

(1) co-dominance **(2)** incomplete dominance
(3) law of dominance **(4)** inheritance of one gene.

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



(1) End of systole **(2)** Contraction of both the atria
(3) Initiation of the ventricular contraction **(4)** Beginning of the systole.

58. Which enzyme/s will be produced in a cell in which there is nonsense mutation in the *lac* Y gene?

(1) Lactose permease and transacetylase **(2)** β – galactosidase
(3) Lactose permease **(4)** Transacetylase.

59. The most abundant intracellular cation is:

(1) K^+ **(2)** Na^+ **(3)** Ca^{++} **(4)** H^+.

60. Which one of the following in **not** the function of placenta? It:

(1) secretes oxytocin during parturition
(2) facilitates supply of oxygen and nutrients to embryo.
(3) secretes estrogen
(4) facilitates removal of carbon dioxide and waste material from embryo.

61. In plant breeding programmes, the entire collection (of plants/seeds) having all the disverse alleles for all genes in a given crop is called:

(1) germplasm collection. **(2)** selection of superior recombinants
(3) cross – hybridization among the selected parents.
(4) evaluation and selection of parents.

62. Which one of the following is **not** a correct statement?

(1) Key is a taxonomic aid for identification of specimens.
(2) Herbarium houses dried, pressed and preserved plant specimens.
(3) Botanical gardens have collection of living plants for reference.
(4) A museum has collection of photographs of plants and animals.

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

(1) Rough endoplasmic reticulum, protein synthesis
(2) Rough endoplasmic reticulum, formation of glycoproteins
(3) Golgi apparatus, protein synthesis
(4) Golgi apparatus, formation of glycolipids.

64. Which of the following represent maximum number of species among global biodiversity?

(1) Mosses and Ferns **(2)** Algae
(3) Lichens **(4)** Fungi

65. Which of the following Bt crops is being grown in India by the farmers?

(1) Soybean **(2)** Maize **(3)** Cotton **(4)** Brinjal

66. 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.

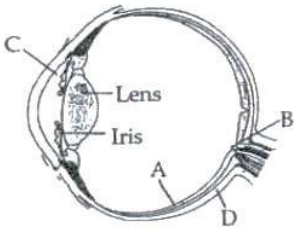
How many of the above statement are correct?

(1) Four **(2)** One **(3)** Two **(4)** Three.

67. The essential chemical components of many coenzymes are:

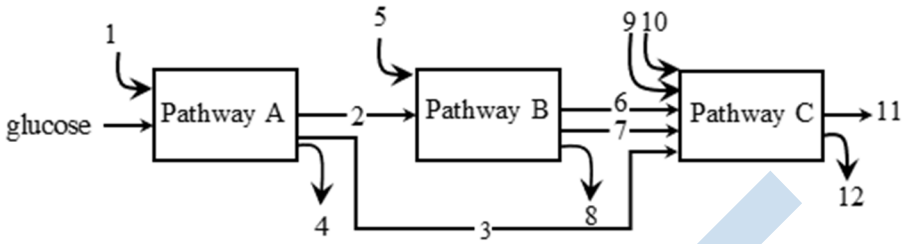
(1) Vitamins **(2)** Proteins **(3)** Nucleic acids **(4)** Carbohydrates.

68. 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 function / characteristics:



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

69. 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:

(1) FAD^+ or $FADH_2$ **(2)** NADH
(3) ATP **(4)** H_2O.

70. Pigment – containing membranous extensions in some cyanobacteria are:

(1) Chromatophores **(2)** Heterocysts
(3) Basal bodies **(4)** Pneumatophores

71. Which of the following statements is correct?

(1) Tapetum nourishes the developing pollen
(2) Hard outer layer of pollen is called intine
(3) Sporogenous tissue is haploid.
(4) Endothecium produces the microspores

72. The characteristics and an example of a synovial joint in human is:

	Characteristics	**Examples**
(1)	lymph filled between two bones, limited movement	gliding joint between carpals
(2)	fluid cartilage between two bones, limited movements	Knee joint
(3)	fluid filled between two joints, provides cushion	skull bones
(4)	fluid filled synovial cavity between two bones	joint between atlas and axis

73. The Air Prevention and Control of Pollution Act came into force in:

(1) 1990 **(2)** 1975 **(3)** 1981 **(4)** 1985.

74. Product of sexual reproduction generally generates:

(1) Large biomass **(2)** Longer viability of seeds
(3) Prolonged dormancy
(4) New genetic combination leading to variation.

75. 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?

(1) Eighteen **(2)** Six **(3)** Ten **(4)** Fifteen.

76. A pregnant female delivers a baby who suffers from stunted growth, mental retardation low intelligence quotient and abnormal skin.

(1) Over secretion of pars distalis **(2)** Deficiency of iodine in diet
(3) Low secretion of growth hormone **(4)** Cancer of the thyroid gland.

77. Which of the following is not correctly matched for the organism and its cell wall degrading enzyme?

(1) Fungi – Chitinase **(2)** Bacteria – Lysozyme
(3) Plant cells – Cellulase **(4)** Algae – Methylase.

78. Menstrual flow occurs due to lack of:

(1) Vasopressin **(2)** Progesterone **(3)** FSH **(4)** Oxytocin

79. Global warming can be controlled by:

(1) Increasing deforestation, reducing efficiency of energy usage.
(2) Reducing deforestation, cutting down use of fossil fuel
(3) Reducing reforestation, increasing the use of fossil fuel
(4) Increasing deforestation, slowing down the growth of human population.

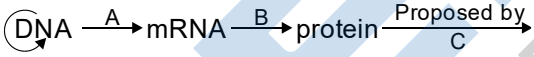
80. Which one of the following is not used for *ex situ* plant conservation?

(1) Botanical Gardens **(2)** Field gene banks
(3) Seed banks **(4)** Shifting cultivation

81. During sewage treatment, biogases, are produced which include:

(1) hydrogensulphide, nitrogen, methane
(2) methane, hydrogensulphide, carbon dioxide
(3) methane, oxygen, hydrogensulphide
(4) hydrogensulphide, methane, sulphur dioxide

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



(1) A - translation B - extension C - Rosalind Franklin
(2) A - transcription B - replication C - James Watson
(3) A - translation B - transcription C - ErevinChargalff
(4) A - transcription B - translation C - Francis Crick

83. DNA fragments generated by the restriction endonucleases in a chemical reaction can be separated by:

(1) Restriction mapping **(2)** Centrifugation
(3) Polymerase chain reaction **(4)** Electrophoresis

84. The complex formed by a pair of synpased homologous chromosomes is called:

(1) Axoneme **(2)** Equatorial plate
(3) Kinetochore **(4)** Bivalent

85. The incorrect statement with regard to Haemophilia is:

(1) A single protein involved in the clotting of blood is affected
(2) It is a sex - linked disease
(3) It is a recessive disease
(4) It is a dominant disease

86. Which of the following statements is correct in relation to the endocrine system?

(1) Releasing and inhibitory hormones are produced by the pituitary gland

(2) Adenohypophysis is under direct neural regulation of the hypothalamus

(3) Organs in the body like gastrointestinal tract, heart, kidney and liver do not produce any hormones

(4) Non-nutrient chemicals produced by the body in trace amount that act as intercellular messenger are known as hormones.

87. Lenticels are involved in:

(1) Photosynthesis **(2)** Transpiration **(3)** Gaseous exchange **(4)** Food transport

88. 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**
(1)	*Adamsia*	radially symmetrical	Porifera
(2)	*Petromyzon*	ectoparasite	Cyclostomata
(3)	*Ichthyophis*	terrestrial	Reptilia
(4)	*Limulus*	body covered by chitinous exoskeleton	Pisces

89. What is the correct sequence of sperm formation?

(1) Spermatogonia, spermatocyte, spermatid, spermatozoa

(2) Spermatid, spermatocyte, spermatogonia, spermatozoa

(3) Spermatogonia, spermatocyte, spermatozoa, spermatid

(4) Spermatogonia, spermatozoa, spermatocyte, spermatid

90. Macro molecule chitin is:

(1) simple polysaccharide **(2)** nitrogen containing polysaccharide

(3) phosphorus containing polysaccharide **(4)** sulphur containing polysaccharide

SECTION - II (PHYSICS) 180 MARKS

91. In Young's double slit experiment, the slits are 2 mm apart and are illuminated by photons of two wavelengths $\lambda_1 = 12000$ Å and $\lambda_2 = 10000$ Å. At what minimum distance from the common central bright fringe on the screen 2 m from the slit will a bright fringe from one interference pattern coincide with a bright fringe from the other?

(1) 3 mm **(2)** 8 mm **(3)** 6 mm **(4)** 4 mm

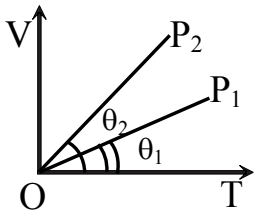
92. In a common emitter (CE) amplifier having a voltage gain G, the transistor used has transconductance0.03 mho and current gain 25. If the above transistor is replaced with another one with transonductance0.02 mho and current gain 20, the voltage gain will be:

(1) $\frac{5}{4}G$ **(2)** $\frac{2}{3}G$ **(3)** 1.5 G **(4)** $\frac{1}{3}G$

93. A certain mass of Hydrogen is changed to Helium by the process of fusion. The mass defect in fusion reaction is 0.02866 u. The energy liberated per u is: (given 1 u = 931 MeV)

(1) 13.35 MeV **(2)** 2.67 MeV **(3)** 26.7 MeV **(4)** 6.675 MeV

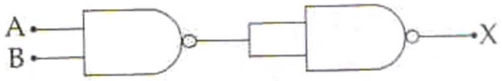
94. In the given (V – T) diagram, what is the relation between pressures P_1 and P_2?



(1) Cannot be predicted **(2)** $P_2 = P_1$

(3) $P_2 > P_1$ **(4)** $P_2 < P_1$

95. The output (X) of the logic circuit shows in figure will be :



(1) $X = \overline{A + B}$ **(2)** $X = \overline{\overline{A}.\overline{B}}$ **(3)** $X = \overline{A.B}$ **(4)** $X = A.B$

96. Three blocks with masses m, 2m and 3m are connected by strings, as shown in the figure. After an upward force F is applied on block m, the masses move upward at constant speed v. What is the net force on the block of mass 2 m?
(g is the acceleration due to gravity)

(1) 6 mg **(2)** Zero **(3)** 2 mg **(4)** 3 mg

97. In a n-type semiconductor, which of the following statement is true:

(1) Holes are majority carriers and trivalent atoms are dopants.

(2) Electrons are majority carriers and trivalent atoms are dopants.

(3) electron are minority carriers and pentavalent atoms are dopants.

(4) Holes are minority carriers and pentavalent atoms are dopants.

98. The half life of a radioactive isotope 'X' is 20 years. It decays to another element 'Y' which is stable. The two elements 'X' and 'Y' were found to be in the ratio 1 : 7 in a sample of a given rock. The age of the rock is estimated to be:

(1) 100 years **(2)** 40 years **(3)** 60 years **(4)** 80 years

99. The molar specific heats of an ideal gas at constant pressure and volume are denoted by C_p and C_v, respectively. If $\gamma = \frac{C_p}{C_v}$ and R is the universal gas constant, then C_v is equal to:

(1) γR **(2)** $\frac{1+\gamma}{1-\gamma}$ **(3)** $\frac{R}{(\gamma-1)}$ **(4)** $\frac{(\gamma-1)}{R}$

100. The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by:

(1) $\lambda_p \propto \frac{1}{\sqrt{\lambda_e}}$ **(2)** $\lambda_p \propto \lambda_e^2$ **(3)** $\lambda_p \propto \lambda_e$ **(4)** $\lambda_p \propto \sqrt{\lambda_e}$

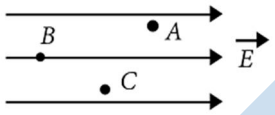
101. Ratio of longest wave lengths corresponding to Lyman and Balmer series in hydrogen spectrum is:

(1) $\frac{9}{31}$ **(2)** $\frac{5}{27}$ **(3)** $\frac{3}{23}$ **(4)** $\frac{7}{29}$

102. A current loop in a magnetic field:

(1) Can be in equilibrium in two orientations, one stable while the other is unstable.
(2) experiences a torque whether the field is uniform or non uniform in all orientations.
(3) can be in equilibrium in one orientation.
(4) can be in equilibrium in two orientations, both the equilibrium states are unstable.

103. A, B and C are three points in a uniform electric field. The electric potential is:



(1) same at all the three points A, B and C
(2) maximum at A
(3) maximum at B **(4)** maximum at C

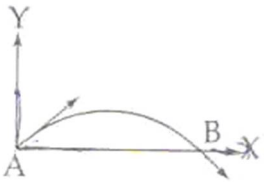
104. A rod PQ of mass M and length L is hinged at end P. The rod is kept horizontal by a massless string tied to point Q as shown in figure. When string is cut, the initial angular acceleration of the rod is:

(1) $\frac{2g}{3L}$ **(2)** $\frac{3g}{2L}$ **(3)** $\frac{g}{L}$ **(4)** $\frac{2g}{L}$

105. A wire of resistance $4\ \Omega$ is stretched to twice its original length. The resistance of stretched wire would be:

(1) $16\ \Omega$ **(2)** $2\ \Omega$ **(3)** $4\ \Omega$ **(4)** $8\ \Omega$

106. The velocity of a projectile at the initial point A is $\left(2\hat{i}+3\hat{j}\right)$ m/s. It's velocity (in m/s) at point B is:



(1) $2\hat{i}+3\hat{j}$ **(2)** $-2i-3\hat{j}$ **(3)** $-2\hat{i}+3\hat{j}$ **(4)** $2\hat{i}-3\hat{j}$

107. A body of mass 'm' is taken from the earth's surface to the height equal to twice the radius (R) of the earth. The change in potential energy of body will be:

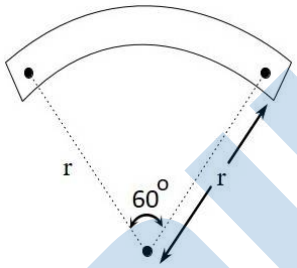
(1) $\frac{1}{3}$mgR **(2)** mg2R **(3)** $\frac{2}{3}$mgR **(4)** 3mgR

108. A stone falls freely under gravity. It covers distances h_1, h_2 and h_3 in the first 5 seconds, the next 5 seconds and the next 5 seconds respectively. The relation between h_1, h_2 and h_3 is:

(1) $h_1 = h_2 = h_3$ **(2)** $h_1 = 2h_2 = 3h_3$

(3) $h_1 = \frac{h_2}{3} = \frac{h_3}{5}$ **(4)** $h_2 = 3h_1$ and $h_3 = 3h_2$

109. A bar magnet of length '*l*' and magnetic dipole moment 'M' is bent in the form of an arc as shown in figure. The new magnetic dipole moment will be:



(1) $\frac{M}{2}$ **(2)** M **(3)** $\frac{3}{\pi}$M **(4)** $\frac{2}{\pi}$M

110. The internal resistance of a 2.1 V cell which gives a current of 0.2. A through a resistance of 10Ω is:

(1) 1.0 Ω **(2)** 0.2 Ω **(3)** 0.5 Ω **(4)** 0.8 Ω

111. For photoelectric emission from certain metal the cutoff frequency is ν. If radiation of frequency 2ν impinges on the metal plate, the maximum possible velocity of the emitted electron will be (m is the electron mass):

(1) $2\sqrt{h\nu / m}$ **(2)** $\sqrt{h\nu / (2m)}$ **(3)** $\sqrt{h\nu / m}$ **(4)** $\sqrt{2h\nu / m}$

112. During an adiabatic process, the pressure of a gas is found to be proportional to the cube of its temperature. The ratio of $\frac{C_p}{C_v}$ for the gas is:

(1) $\frac{3}{2}$ **(2)** $\frac{4}{3}$ **(3)** 2 **(4)** $\frac{5}{3}$

113. The following four wires are made of the same material. Which of these will have the largest extension when the same tension is applied?

(1) length = 300 cm, diameter = 3 mm **(2)** length 50 cm, diameter = 0.5 mm

(3) length = 100 cm, diameter = 1mm **(4)** length = 200 cm, diameter = 2mm

114. The resistance of the four arms P, Q, R and S in a Wheatstone's bridge are 10 ohm, 30 ohm, 30 ohm and 90 ohm, respectively. The e.m.f. and internal resistance of the cell are 7 Volt and 5 ohm respectively. If the galvanometer resistance is 50 ohm, the current drawn from the cell will be:

(1) 2.0 A **(2)** 1.0 A **(3)** 0.2 A **(4)** 0.1 A

115. The amount of heat energy required to raise the temperature of 1 g of Helium at NTP, from T_1K to T_2K is :

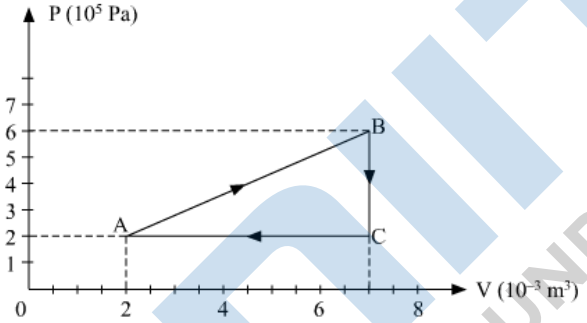
(1) $\frac{3}{4}N_a k_B\left(\frac{T_2}{T_1}\right)$ **(2)** $\frac{3}{8}N_a k_B(T_2 - T_1)$ **(3)** $\frac{3}{2}N_a k_B(T_2 - T_1)$ **(4)** $\frac{3}{4}N_a k_B(T_2 - T_1)$

116. A piece of iron is heated in a flame. It first becomes dull red then becomes reddish yellow and finally turns to white hot. The correct explanation for the above observation is possible by using :

(1) Newton's Law of cooling **(2)** Stefan's Law

(3) Wien's displacement Law **(4)** Kirchoff's Law

117. A gas is taken through the cycle $A \rightarrow B \rightarrow C \rightarrow A$, as shown. What is the net work done by the gas?



(1) – 2000 J **(2)** 2000 J **(3)** 1000 J **(4)** zero

118. The condition under which a microwave oven heats up a food item containing water molecules most efficiently is:

(1) Infra-red waves produce heating in a microwave oven.

(2) The frequency of the microwaves must match the resonant frequency of the water molecules.

(3) The frequency of the microwaves has no relation with natural frequency of water molecules.

(4) Microwaves are heat waves, so always produce heating.

119. An explosion breaks a rock into three parts in a horizontal plane. Two of them go off at right angles to each other. The first part of mass 1 kg moves with a speed of 12 ms^{-1} and the second part of mass 2 kg moves with 8 ms^{-1} speed. If the third part flies off with 4 ms^{-1} speed, then its mass is:

(1) 17 kg **(2)** 3 kg **(3)** 5 kg **(4)** 7 kg

120. In an experiment four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as follows:

$P = \frac{a^3b^2}{cd}$ % error in P is :

(1) 4% **(2)** 14% **(3)** 10% **(4)** 7%

121. A small object of uniform density rolls up a curved surface with an initial velocity 'v'. It reaches upto a maximum height of $\frac{3v^2}{4g}$ with respect to the initial position. The object is:

(1) Disc **(2)** Ring **(3)** Solid sphere **(4)** Hollow sphere

122. A plano convex lens fits exactly into a plano concave lens. Their plane surfaces are parallel to each other. If lenses are made of different materials of refractive indices μ_1 and μ_2 and R is the radius of curvature of the curved surface of the lenses, then the focal length of the combination is :

(1) $\frac{2R}{(\mu_2-\mu_1)}$ **(2)** $\frac{R}{2(\mu_1+\mu_2)}$ **(3)** $\frac{R}{2(\mu_1-\mu_2)}$ **(4)** $\frac{R}{(\mu_1-\mu_2)}$

123. A parallel beam of fast moving electrons is incident normally on a narrow slit. A fluorescent screen is placed at a large distance from the slit. If the speed of the electrons is increased, which of the following statements is correct?

(1) The angular width of the central maximum will be unaffected.
(2) Diffraction pattern is not observed on the screen in the case of electron.
(3) The angular width of the central maximum of the diffraction pattern will increase.
(4) The angular width of the central maximum will decreases.

124. For a normal eye, the cornea of eye provides a converging power of 40 D and the least converging power of the eye lens behind the cornea is 20 D. Using this information, the distance between the retina and the cornea-eye lens can be estimated to be :

(1) 1.5 cm **(2)** 5 cm **(3)** 2.5 cm **(4)** 1.67 cm

125. The upper half of an inclined plane of inclination θ is perfectly smooth while lower half is rough. A block starting from rest at the top of the plane will again come to rest at the bottom, if the coefficient of friction between the block and lower half of the plane is given by :

(1) $\mu = \tan\theta$ **(2)** $\mu = \frac{1}{\tan\theta}$ **(3)** $\mu = \frac{2}{\tan\theta}$ **(4)** $\mu = 2\tan\theta$

126. A wave travelling in the +ve x-direction having displacement along y-direction as 1 m, wavelength 2πm and frequency of $\frac{1}{\pi}$ Hz is represented by :

(1) $y = \sin(2\pi x + 2\pi t)$ **(2)** $y = \sin(x - 2t)$
(3) $y = \sin(2\pi x - 2\pi t)$ **(4)** $y = \sin(10\pi x - 20\ \pi t)$

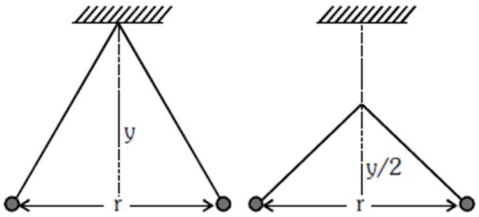
127. A source of unknown frequency gives 4 beats / s, when sounded with a source of known frequency 250 Hz. The second harmonic of the source of unknown frequency gives five beats per second, when sounded with a source of frequency 513 Hz. The unknown frequency is:

(1) 260 Hz **(2)** 254 Hz **(3)** 246 Hz **(4)** 240 Hz

128. A coil of self-inductance L is connected in series with a bulb B and an AC source. Brightness of the bulb decrease when:

(1) an iron rod is inserted in the coil.
(2) frequency of the AC source is decreases.
(3) number of turns in the coil is reduced.
(4) a capacitance of reactance $X_C = X_L$ is included in the same circuit.

129. Two pith balls carrying equal charges are suspended from a common point by strings of equal length, the equilibrium separation between them is r. Now the strings are rigidly clamped at half the height. The equilibrium separation between the balls now become:



(1) $\left(\frac{2r}{3}\right)$ **(2)** $\left(\frac{1}{\sqrt{2}}\right)^2$ **(3)** $\left(\frac{r}{\sqrt[3]{2}}\right)$ **(4)** $\left(\frac{2r}{\sqrt{3}}\right)$

130. If we study the vibration of a pipe open at both ends, then the following statement is **not** true:

(1) Pressure change will be maximum at both ends
(2) Open end will be antinode
(3) Odd harmonics of the fundamental frequency will be generated
(4) All harmonics of the fundamental frequency will be generated

131. When a proton is released from rest in a room, it starts with an initial acceleration a_0 towards west. When it is projected towards north with a speed v_0 it moves with an initial acceleration $3a_0$ towards west. The electric and magnetic fields in the room are:

(1) $\frac{ma_0}{e}$ east, $\frac{3ma_0}{ev_0}$ down **(2)** $\frac{ma_0}{e}$ west, $\frac{2ma_0}{ev_0}$ up

(3) $\frac{ma_0}{e}$ west, $\frac{2ma_0}{ev_0}$ down **(4)** $\frac{ma_0}{e}$ east, $\frac{3ma_0}{ev_0}$ up

132. A wire loop is rotated in a magnetic field. The frequency of change of direction of the induced e.m.f. is:

(1) six times per revolution **(2)** once per revolution
(3) twice per revolution **(4)** four times per revolution

133. A uniform force of $(3i + j)$ newton acts on a particle of mass 2kg. Hence the particle is displaced from position $\left(2\hat{i} + \hat{k}\right)$ meter to position $\left(4\hat{i} + 3\hat{j} - \hat{k}\right)$ meter. The work done by the force on the particle is :

(1) 15 J **(2)** 9J **(3)** 6 J **(4)** 13 J

134. The wettability of a surface by a liquid depends primarily on:

(1) angle of contact between the surface and the liquid.
(2) viscosity
(3) surface tension **(4)** density

135. Infinite number of bodies, each of mass 2 kg are situated on x-axis at distances 1m, 2m, 4m, 8m, . . . , respectively, from the origin. The resulting gravitational potential due to theis system at the origin will be:

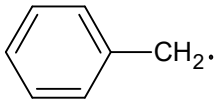
(1) – 4G **(2)** –G **(3)** $-\frac{8}{3}G$ **(4)** $-\frac{4}{3}G$

SECTION - III (CHEMISTRY) 180 MARKS

136.[E] The value of Planck's constant is 6.63×10^{-34}Js. The speed of light is 3×10^{17} nms^{-1}. Which value is closest to the wavelength in nanometer of a quantum of light with frequency of 6×10^{5} s^{-1}?

(1) 75 **(2)** 10 **(3)** 25 **(4)** 50

137.[M] The radical



is aromatic because it has:

(1) 6 p-orbitals and 7 unpaired electrons
(2) 6 p-orbitals and 6 unpaired electrons
(3) 7 p-orbitals and 6 unpaired electrons
(4) 7 p-orbitals and 7 unpaired electrons

138.[E] Which of the following is electron-deficient?

(1) PH_3 **(2)** $(CH_3)_2$ **(3)** $(SiH_3)_2$ **(4)** $(BH_3)_2$

139.[M] Which of the following statements about the interstitial compounds is correct?

(1) They have higher melting points than the pure metal.
(2) They retain metallic conductivity
(3) They are chemically reactive
(4) They are much harder than the pure metal

140.[M] How many grams of concentrated nitric acid solution should be used to prepare 250mL of 2.0 M HNO_3? The concentrated acid is 70% HNO_3.

(1) 54.0 conc. HNO_3 **(2)** 45.0 g conc. HNO_3
(3) 90.0 g conc. HNO_3 **(4)** 70.0 g conc. HNO_3

141.[M] Which of the following lanthanoid ions is diamagnetic?
(At nos. Ce = 58, Sm = 62, Eu = 63, Yb = 70)

(1) Yb^{2+} **(2)** Ce^{2+} **(3)** Sm^{2+} **(4)** Eu^{2+}

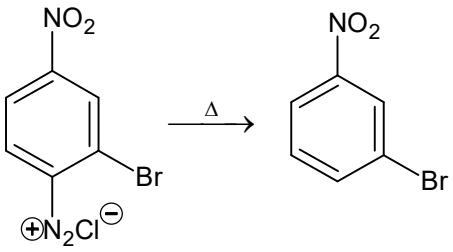
142.[E] Which one of the following molecules contains no π-bonds?

(1) NO_2 **(2)** CO_2 **(3)** H_2O **(4)** SO_2

143.[E] Based on equation $E = -2.178 \times 10^{-18}J \left(\frac{Z^2}{n^2}\right)$ certain conclusions are written. Which of them is not correct?

(1) For n = 1, the electron has a more negative energy than it does for n = 6 which means that the electron is more loosely bound in the smallest allowed orbit.
(2) The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than it would be if the electrons were at the infinite distance from the nucleus.
(3) Larger the value of n, the larger is the orbit radius
(4) Equation can be used to calculate the change in energy when the electron changes orbit.

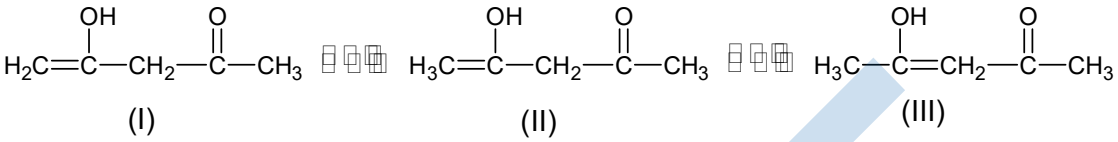
144.[E] In the reaction



A is:

(1) H^+/H_2O **(2)** $HgSO_4/H_2SO_4$ **(3)** Cu_2Cl_2 **(4)** H_3PO_2 and H_2O

145.[M] The order of stability of the following tautomeric compounds is:



(I) (II) (III)

(1) II > III > I **(2)** I > II > III **(3)** III > II > I **(4)** II > I > III

146.[E] Nylon is an example of:

(1) Polythene **(2)** Polyester **(3)** Polysaccharide **(4)** Polyamide

147.[E] XeF_2 is isostructural with:

(1) $BaCl_2$ **(2)** TeF_2 **(3)** ICl_2^- **(4)** $SbCl_3$

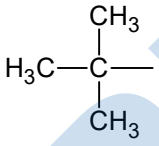
148.[E] The basic structural unit of silicates is:

(1) SiO_4^{2-} **(2)** SiO^- **(3)** SiO_4^{4-} **(4)** SiO_3^{2-}

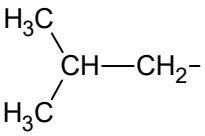
149.[E] Which of the following structure is similar to graphite?

(1) B_2H_6 **(2)** BN **(3)** B **(4)** B_4C

150.[E] The structure of isobutyl group in an organic compound is:



(1)



(2)

(3) $CH_3–CH–CH_2–CH_3$ **(4)** $CH_3–CH_2–CH_2–CH_2–$

151.[E] The number of carbon atoms per unit cell of diamond unit cell is:

(1) 1 **(2)** 4 **(3)** 8 **(4)** 6

152.[E] An excess of $AgNO_3$ is added to 100 mL of a 0.01 M solution of dichlorotetraaquachromium(III) chloride. The number of moles of AgCl precipitated would be:

(1) 0.01 **(2)** 0.001 **(3)** 0.002 **(4)** 0.003

153.[E] What is the maximum numbers of electrons that can be associated with the following set of quantum numbers? n = 3, l = 1 and m = –1

(1) 2 **(2)** 10 **(3)** 6 **(4)** 4

154.[M] Which of these is not a monomer for a high molecular mass silicone polymer?

(1) $PhSiCl_3$ **(2)** $MeSiCl_3$ **(3)** Me_2SiCl_2 **(4)** Me_3SiCl

155.[E] A reaction having equal energies of activation for forward and reverse reactions has:

(1) $\Delta H = \Delta G = \Delta S = 0$ **(2)** $\Delta S = 0$

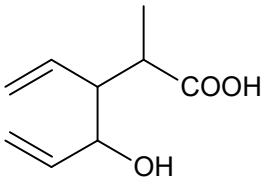
(3) $\Delta G = 0$ **(4)** $\Delta H = 0$

156.[E] At 25°C molar conductance of 0.1 molar aqueous solution of ammonium hydroxide is 9.54 ohm^{-1} cm^2mol^{-1} and at infinite dilution is molar conductance is 238 ohm^{-1} cm^2mol^{-1}. The degree of ionization of ammonium hydroxide at the same concentration and temperature is:

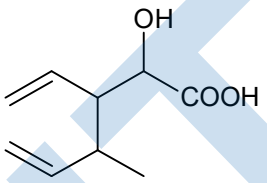
(1) 40.800% **(2)** 2.080% **(3)** 20.800% **(4)** 4.008%

157.[E] Structure of the compound whose IUPAC name is 3-Ethyl-2-hydroxy-4-methylhex-3-en-5-ynoic acid is

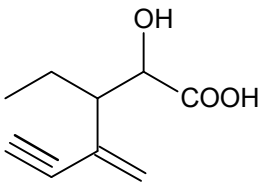
(1)



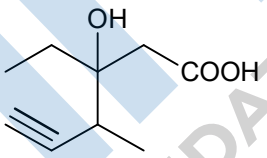
(2)



(3)

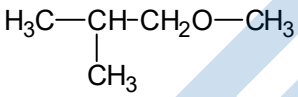


(4)



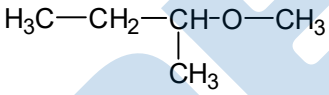
158.[M] Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI?

(1)

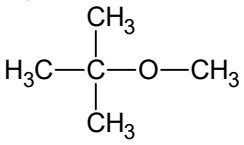


(2) $CH_3 - CH_2 - CH_2 - CH_2 - O - CH_3$

(3)



(4)



159.[E] Antiseptics and disinfectants either kill or prevent growth of microorganism. Identify which of the following statements is not true:

(1) Disinfectants harm the living tissues

(2) A 0.2% solution of phenol is an antiseptic while 1% solution acts as a disinfectant

(3) Chlorine and Iodine are used as strong disinfectants

(4) Dilute solutions of Boric acid and Hydrogen Peroxide are strong antiseptics

160.[E] A magnetic moment of 1.73 BM will be shown by one among the following:

(1) $[CoCl_6]^{4-}$ **(2)** $[Cu(NH_3)_4]^{2+}$ **(3)** $[Ni(CN)_4]^{2-}$ **(4)** $TiCl_4$

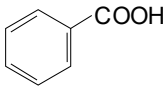
161.[D] $KMnO_4$ can be prepared from K_2MnO_4 as per the reaction:

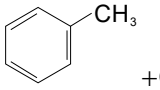
$3MnO_4^{2-} + 2H_2O \rightleftharpoons 2MnO_4^- + MnO_2 + 4OH^-$

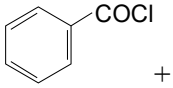
The reaction can go to completion by removing OH^- ions by adding:

(1) SO_2 **(2)** HCl **(3)** KOH **(4)** CO_2

162.[M] Reaction by which Benzaldehyde cannot be prepared:

(1)  + Zn / Hg and conc. HCl

(2)  $+CrO_2Cl_2$ in CS_2 followed by H_3O^+

(3)  + H_2 in presence of Pd-$BaSO_4$

(4)  + CO + HCl in presence of anhydrous $AlCl_3$

163.[E] Which of the following does not give oxygen on heating?

(1) $(NH_4)_2Cr_2O_7$ **(2)** $KClO_3$ **(3)** $Zn(ClO_3)_2$ **(4)** $K_2Cr_2O_7$

164.[E] A metal has a fcc lattice. The edge length of the unit cell is 404 pm. The density of the metal is 2.72 g cm^{-3}. The molar mass of the metal is:

(N_A Avogadro's constant = $6.02 \times 10^{23} mol^{-1}$)

(1) 20 g mol^{-1} **(2)** 40 g mol^{-1} **(3)** 30 g mol^{-1} **(4)** 27 g mol^{-1}

165.[E] Dipole-induced dipole interactions are present in which of the following pairs:

(1) SiF_4 and He atoms **(2)** H_2O and alcohol

(3) Cl_2 and CCl_4 **(4)** HCl and He atoms

166.[E] Roasting of sulphides gives the gas X as a byproduct. This is a colorless gas with choking smell of burnt sulphur and causes great damage to respiratory organs as a result of acid rain. Its aqueous solution is acidic, acts as a reducing agent and its acid has never been isolated. The gas X is:

(1) SO_3 **(2)** H_2S **(3)** SO_2 **(4)** CO_2

167.[E] Some meta-directing substituents in aromatic substitution are given. Which one is most deactivating?

(1) $-NO_2$ **(2)** $-C \equiv N$ **(3)** $-SO_3H$ **(4)** –COOH

168.[E] Nitrobenzene on reaction with conc. HNO_3/H_2SO_4 at 80 – 100°C forms which one of the following products?

(1) 1, 2, 4 – Trinitrobenzene **(2)** 1, 2 – Dinitrobenzene

(3) 1, 3 – Dinitrobenzene **(4)** 1, 4 – Dinitrobenzene

169.[M] A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl of pH = 10 and by passing hydrogen gas around the platinum wire at one atm pressure. The oxidation potential of electrode would be?

(1) 1.18 V **(2)** 0.059 V **(3)** 0.59 V **(4)** 0.118 V

170.[E] Which of the following is a polar molecule?

(1) XeF_4 **(2)** BF_3 **(3)** SF_4 **(4)** SiF_4

171.[M] A button cell used in watches functions as following

$$Zn(s) + Ag_2O(s) + H_2O(l) \rightleftharpoons 2Ag(s) + Zn^{2+}(aq) + 2OH^-(aq)$$

If half cell potentials are

$$Zn^{2+}(aq) + 2e^- \rightarrow Zn(s);\ E^\circ = -0.76\,V$$

$$Ag_2O(s) + H_2O(l) + 2e^- \rightarrow 2Ag(s) + 2OH^-(aq),\ E = 0.34\,V$$

The cell potential will be:

(1) 1.34 V **(2)** 1.10 V **(3)** 0.42 V **(4)** 0.84 V

172.[E] Which of these is least likely to act as a Lewis base?

(1) PF_3 **(2)** CO **(3)** F^- **(4)** BF_3

173.[E] Which of the following compounds will not undergo Friedel - Craft's reaction easily:

(1) Toluene **(2)** Cumene **(3)** Xylene **(4)** Nitrobenzene

174.[E] Which is the monomer of Neoprene in the following?

(1) $CH_2 = CH - C \equiv CH$ **(2)** $CH_2 = CH - CH = CH_2$

(3) $CH_2 = \underset{\displaystyle CH_3}{\underset{|}{C}} - CH = CH_2$ **(4)** $CH_2 = \underset{\displaystyle Cl}{\underset{|}{C}} - CH = CH_2$

175.[E] 6.02×10^{20} molecules of urea are present in 100 mL of its solution. The concentration of solution is:

(1) 0.1 M **(2)** 0.02 M **(3)** 0.01 M **(4)** 0.001 M

176.[E] Maximum deviation from ideal gas is expected from:

(1) $NH_3(g)$ **(2)** $H_2(g)$ **(3)** $N_2(g)$ **(4)** $CH_4(g)$

177.[E] Which of the following is paramagnetic?

(1) NO^+ **(2)** CO **(3)** O_2^- **(4)** CN^-

178.[E] Identify the correct order of solubility in aqueous medium:

(1) $Na_2S > ZnS > CuS$ **(2)** $CuS > ZnS > Na_2S$

(3) $ZnS > Na_2S > CuS$ **(4)** $Na_2S > CuS > ZnS$

179.[E] What is the activation energy for a reaction if its rate doubles when the temperature is raised from 20°C to 35° C? ($R = 8.314\ J\ mol^{-1}\ K^{-1}$)

(1) 15.1 kJ mol^{-1} **(2)** 342 kJ mol^{-1} **(3)** 269 kJ mol^{-1} **(4)** 34.7 kJ mol^{-1}

180.[E] Which is the strongest acid in the following?

(1) H_2SO_3 **(2)** H_2SO_4 **(3)** $HClO_3$ **(4)** $HClO_4$

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ANSWER KEY

BIOLOGY				PHYSICS		CHEMISTRY	
1.	(4)	46.	(1)	91.	(3)	136.	(4)
2.	(3)	47.	(2)	92.	(2)	137.	(4)
3.	(4)	48.	(4)	93.	(3)	138.	(4)
4.	(4)	49.	(3)	94.	(4)	139.	(3)
5.	(4)	50.	(3)	95.	(4)	140.	(2)
6.	(2)	51.	(3)	96.	(2)	141.	(1)
7.	(2)	52.	(4)	97.	(4)	142.	(3)
8.	(3)	53.	(3)	98.	(3)	143.	(1)
9.	(1)	54.	(2)	99.	(3)	144.	(4)
10.	(2)	55.	(4)	100.	(4)	145.	(3)
11.	(2)	56.	(3)	101.	(2)	146.	(4)
12.	(2)	57.	(2)	102.	(4)	147.	(3)
13.	(1)	58.	(2)	103.	(3)	148.	(3)
14.	(4)	59.	(1)	104.	(2)	149.	(2)
15.	(3)	60.	(1)	105.	(1)	150.	(2)
16.	(4)	61.	(1)	106.	(4)	151.	(3)
17.	(4)	62.	(4)	107.	(3)	152.	(2)
18.	(4)	63.	(1)	108.	(3)	153.	(1)
19.	(1)	64.	(4)	109.	(3)	154.	(1)
20.	(4)	65.	(3)	110.	(3)	155.	(4)
21.	(4)	66.	(4)	111.	(4)	156.	(4)
22.	(4)	67.	(1)	112.	(1)	157.	(3)
23.	(4)	68.	(2)	113.	(2)	158.	(4)
24.	(2)	69.	(3)	114.	(3)	159.	(4)
25.	(2)	70.	(1)	115.	(3)	160.	(2)
26.	(1)	71.	(1)	116.	(3)	161.	(4)
27.	(3)	72.	(4)	117.	(3)	162.	(1)
28.	(1)	73.	(3)	118.	(3)	163.	(1)
29.	(4)	74.	(4)	119.	(3)	164.	(4)
30.	(2)	75.	(4)	120.	(2)	165.	(4)
31.	(4)	76.	(2)	121.	(1)	166.	(3)
32.	(1)	77.	(4)	122.	(4)	167.	(1)
33.	(2)	78.	(2)	123.	(3)	168.	(3)
34.	(2)	79.	(2)	124.	(4)	169.	(3)
35.	(4)	80.	(4)	125.	(4)	170.	(3)
36.	(3)	81.	(2)	126.	(2)	171.	(2)
37.	(2)	82.	(4)	127.	(2)	172.	(4)
38.	(4)	83.	(4)	128.	(1)	173.	(4)
39.	(2)	84.	(4)	129.	(3)	174.	(4)
40.	(1)	85.	(4)	130.	(1)	175.	(3)
41.	(2)	86.	(4)	131.	(3)	176.	(1)
42.	(3)	87.	(3)	132.	(3)	177.	(3)
43.	(1)	88.	(2)	133.	(2)	178.	(1)
44.	(3)	89.	(1)	134.	(1)	179.	(2)
45.	(4)	90.	(2)	135.	(1)	180.	(4)