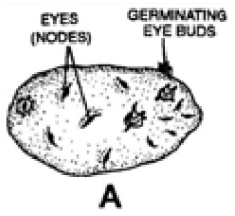
Botany - Section A

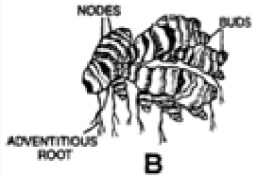
1. Even in absence of pollinating agents seed-setting is assured in
1. *Commellina*
2. *Zostera*
3. *Salvia*
4. fig

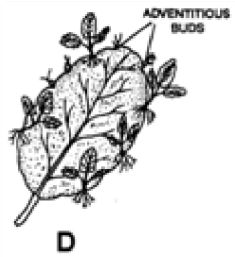
2. During formation of which of the following free nuclear division occurs?
1. Flower
2. Endosperm
3. Gametes
4. Fruit

3. A true-breeding plant line can be obtained by
1. Cross-pollination
2. Self-pollination
3. Continuous Cross-pollination
4. Continuous Self pollination

4. Examine the figures given below and select the right options out of (a - d); in which all the 4 items A, B, C and D are identified correctly:



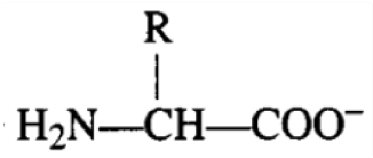


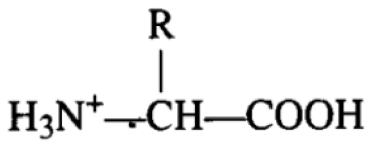


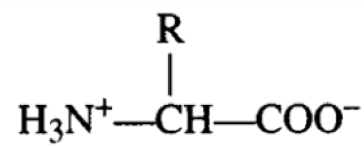
	A	B	C	D
1.	Tuber	Offset	Sucker	Leaf buds
2.	Offset	Sucker	Stolon	Leaf buds
3.	Offset	Sucker	Stolon	Leaf buds
4.	Tuber	Rhizome	Bulbil	Leaf buds

5. Alec Jeffrey's name is associated with
1. DNA sequencing
2. DNA fingerprinting
3. RNA sequencing
4. Gene cloning

6.

A. 

B. 

C. 

Which of the above is Zwitterionic form?
1. B
2. C
3. A
4. All are correct

7. Parasites often have one or two intermediate hosts or vectors
1. To make a life cycle more complicated
2. To facilitate parasitization of its primary host
3. To cause advanced life cycle
4. To infect a broad range of organisms

8. The rupture and fractionation do not usually occur in the water column in vessel/tracheids during the ascent of sap because of
1. lignified thick walls
2. cohesion and adhesion
3. weak gravitational pull
4. transpiration pull

9. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by
1. leghaemoglobin
2. xanthophyll
3. carotene
4. cytochrome

10. A plant in your garden avoids photorespiratory losses, has improved water use efficiency, shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilization. In which of the following physiological groups would you assign this plant?
1. C_4
2. CAM
3. Nitrogen-fixer
4. C_3

11. Decomposers are
1. Animalia and Monera
2. Protista and Animalia
3. Fungi and Plantae
4. Bacteria and Fungi

12. Montreal protocol which calls for appropriate action to protect the ozone layer from human activitieswas passed in year
1. 1985
2. 1986
3. 1987
4. 1988

13. Asymptote in a logistic growth curve is obtained when:
1. K=N
2. K>N
3. K<N
4. The value of 'r' approaches zero

14. In sea urchin DNA, which is double stranded, 17% of the bases were shown to be cytosine. The percentages of the other three bases expected to be present in this DNA are :
1. G 17%, A 16.5%,T32.5%
2. G 17%, A 33%,T 33%
3. G8.5%,A50%, T24.5%
4. G 34%,A 24.5%,T 24.5%

15. The terminal and axillary buds arise from
1. Apical meristem
2. intercalary meristem
3.lateral mristem
4.Parenchyma

16. In china rose the flowers are :
1. Actinomorphic, epigynous with valvate aestivation
2. Zygomorphic, hypogynous with imbricate aestivation
3. Zygomorphic, epigynous with twisted aestivation
4. Actinomorphic, hypogynous with twisted aestivation

17. Select the wrong statement :
1. Anisogametes differ either in structure, function or behaviour
2. In Oomycetes, female gamete is smaller and motile, while male gamete is larger and non-motile
3. Chlamydomonas exhibits both isogamy and anisogamy and Fucus shows oogamy
4. Isogametes are similar in structure, function and behaviour

18. The stems of maize and sugarcane have:
1. stilt roots that are hanging supporting structures
2. prop roots that are hanging supporting structures
3. prop roots coming out from the nodes in upper stem
4. supporting stilt roots coming out of the lower nodes of the stem

19. The members of deuteromycetes reproduce only by asexual spores called as:
1. Zoospores
2. Sporangiospores
3. Aplanospores
4. Conidia

20. Satellite DNA is important because it :
1. shows high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is heritable form parents to children.
2. does not code for proteins and is same in all members of the population
3. codes for enzymes needed for DNA replication
4. codes for proteins needed in cell cycle.

21. Find odd out for taxonomic keys
1 Statements in key is called lead
2 Generally analytical in nature
3 Separate taxonomic keys are not needed for each taxonomic category
4 Concept of key was developed by John Ray

22. Cell is the fundamental structural and functional unit of all living organisms because:
1. Anything less than a complete structure of a cell does not ensure independent living.
2. The metabolic reactions can only occur inside a living cell.
3. Nucleic acids present in the cells ensure living state.
4. The membrane bound organelles cause differentiation for proper functioning.

23. In oocytes of some vertebrates, which of the following stages in meiosis can last for years?
1 Leptotene
2 Zygotene
3 Pachytene
4 Diplotene

24. Creeping, green, branched and frequently filamentous like stage in *Funaria*
1 Is called prothallus
2 Arises upon spore germination
3 Is known as gametophore
4 Bear gemma cups for sexual reproduction

25. Find the **odd** one out w.r.t. meiotic cell cycle
1 DNA replication occurs once only *i.e.*, before Gap-2
2 Karyokinesis occurs twice
3 Reduction of ploidy at metaphase-l
4 Crossing over in tetrad stage

26. Read the four statements (a-d) and choose the correct option.
a. Spindle fibers attach to kinetochores of chromosomes during metaphase.
b. Cell growth results in disturbing the ratio between the nucleus and the cytoplasm.
c. Pachytene stage is relatively short-lived compared to the leptotene.
d. Interkinesis is a short-lived stage characterized by duplication of DNA.
1 a, b & c are correct
2 Only c is incorrect
3 b & d are correct
4 a & b are correct

27. Trichome is related with all, except
1. Unicellular elongation of the epidermis in roots
2. Epidermal hairs on the stem
3. Branched or unbranched and secretory
4. Prevent water loss due to tranpiration

28. Removal of shoot tips is a very useful technique to boost the production of tea- leaves. This is because
1. Gibberellins prevent bolting and are inactivated.
2. Auxins prevent leaf drop at early stages.
3. Effect of auxins is removed and growth of lateral buds is enhanced.
4. Gibberellins delay senescence of leaves.

29. RNA interference is used for which of the following purposes in the field of biotechnology?
1. to develop a plant tolerant to abiotic stresses
2. to develop a pest-resistant plant against infestation by nematode
3. to enhance the mineral usage by the plant
4. to reduce post-harvest losses

30. David Tilman conducted long-term ecosystem experiments using outdoor plots. His findings include:
I. Plots with more species showed less year-to-year variation in total biomass.
II. Increased biodiversity contributed to higher productivity.
1. Only I
2. Only II
3. Both I and II
4. Neither I nor II

31. What are minisatellites?
1. 10-40 bp sized small sequences within the genes
2. Short coding repetitive region on the eukaryotic genome
3. Short non-coding repetitive sequence forming large portion of eukaryotic genome
4. Regions of coding strands of the DNA

32. Which of the following is an incorrect statement?
1. The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm.
2. Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm.
3. Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles.
4. Microbodies are present both in plant and animal cells.

33. In typical embryo sac (i) of the eight nuclei are surrounded by cell wall and organised into cells, the remaining (ii) nuclei, called (iii) are situated (iv) the egg apparatus. Choose the correct option for the blanks (i) to (iv).

	(i)	(ii)	(iii)	(iv)
1.	Seven	One	Synergids	Below
2.	Six	Two	Synergids	Above
3.	Six	Two	Polar nuclei	Below
4.	Seven	One	Polar nuclei	Above

34. In anaerobic organisms, the only process in respiration is
1. EMP pathway
2. Tricarboxylic acid cycle
3. Krebs' cycle
4. Citric acid cycle

35. The complex-I of the electron transport system (ETS) present on the inner mitochondrial membrane is known as:
1. Succinate dehydrogenase complex
2. NADH dehydrogenase complex
3. Cytochrome bc_1 complex
4. Cytochrome-c oxidase

Botany - Section B

36. In five kingdom classification, which single kingdom contains blue-green algae, nitrogen-fixing bacteria and methanogenic archaebacteria
1. Monera
2. Protista
3. Plantae
4. Fungi

37. What are the control points where a plant adjusts the quantity and types of solutes that reach the xylem?
1. Cellulose deposited casparian strips
2. Transport proteins of endodermal cell
3. Sclerenchyma around the pericycle
4. The root hairs themselves

38. The core RNA polymerase is capable of catalyzing which steps of transcription?
1. Initiation only
2. Elongation only
3. Termination only
4. All of these

39. Consider the following statements:
Gymnosperms-
I. Are plants in which the ovules remain exposed, both before and after fertilization.
II. Have male and female gametophytes that have independent free-living existence.
III. Are heterosporous.

Which of the above statements are true?
1. I and II only
2. I and III only
3. II and III only
4. I, II and III

40. Which of the following statements is not correct?
1. Insects that consume pollen or nectar without bringing about pollination are called pollen nectar robbers
2. Pollen germination and pollen tube growth are regulated by chemical components of pollen interacting with those of the pistil
3. Some reptiles have also been reported as pollinators in some plant species
4. Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style

41. A pleiotropic gene
1. is expressed only in primitive plants
2. is a gene involved during Pliocene
3. controls a trait only in combination with another gene
4. control multiple traits in an individual

42. Which of the following is not an after effect of water stress?
1. Reducing CO_2 availability
2. Closure of stomata
3. Reducing metabolic activity
4. Increased surface area

43. Secondary productivity is defined with respect to-
1. Producers
2. Consumers
3. Ratio of producers and consumers
4. Trophic level

44. An American company got patent rights on Basmati rice through
1. Trademark Office
2. Asia Patent and Trademark company
3. US Patent and Trademark office
4. US Patent

45. The prime contaminants of sewage water which act as plant nutrient are
1. Nitrates and Phosphates
2. Phosphates
3. Nitrates, DDT
4. Cadmium and DDT

46. Cryopreservation of gametes of threatened species in viable and fertile condition can be referred to as :
1. Advanced ex-situ conservation of biodiversity
2. In situ conservation by sacred groves
3. In situ cryo-conservation of biodiversity
4. In situ conservation of biodiversity

47. The region of meristematic activity has cells of
1 Small size, thin walled and with dense protoplasm
2. Large size, thick walled and with the loose protoplasm
3. Small size, thin walled with loose protoplasm
4. Large size,thin walled and with dense protoplasm

48. Which one of the following is not an inclusion body found in prokaryotes?
1. Phosphate granule
2. Cyanophycean granule
3. Glycogen granule
4. Polysome

49. Select the correct option with respect to mitosis.

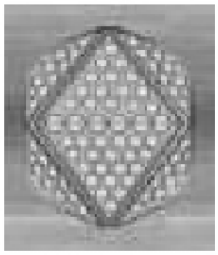
1. Chromatids start moving towards opposite poles in telophase.
2. Golgi complex and endoplasmic reticulum are still visible at the end of prophase.
3. Chromosomes move to the spindle equator and get aligned along equatorial plate in metaphase.
4. Chromatids separate but remains in the center of the cell in anaphase.

50. Which of the following is not an important part of biological farming approach?

1. To know all the life forms that inhabit the field
2. Predators and pests are also analysed
3. The life cycles, patterns of feeding and habitats of all the life forms of that field are analysed
4. To know the abundance of each of the life forms

Zoology - Section A

51. The virus shown here is a causative agent of :



1. Intestinal infections
2. Respiratory infections
3. CNS infections
4. Genito-urinary infections

52. Which of the following statements is incorrect?
1. Life processes are consequences of reactions that occur in an organism.
2. Living organisms are made of inorganic and organic compounds.
3. Life comes from pre-existing life.
4. Genes are not responsible for the stability or changeability of species.

53. If a man consists of an extra copy of chromosome number 18, then the condition is known as
1. Monosomy
2. Trisomy
3. Nullisomy
4. Polyploidy

54. Plasmids are good vectors for genetic engineering because

1. They self replicate within bacterial cells
2. Replicate freely outside bacterial cells
3. Can be replicated in culture
4. Can be replicated in laboratory using enzymes

55. The end result of precipitation of DNA in suspension is seen
1. In the form of dark solution
2. In the form of effervescence
3. In the form of fine threads
4. In the form of bubbles

56. Primers are not
1. Small
2. Biologically synthesized
3. Oligonucleotides
4. Complementary to the regions of DNA

57. The regions neither clearly sensory nor motor in function in CNS are

1. Association area
2. Ascending area
3. Descending area
4. Axonal area

58. A person is having problems with calcium and phosphorus metabolism in his body. Which one of the following glands may not be functioning properly?
1. Parathyroid
2. Parotid
3. Pancreas
4. Thyroid

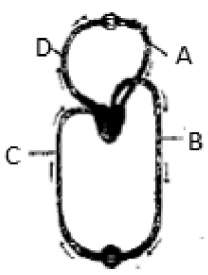
59. Reduction in pH of blood will
1. reduce the blood supply to the brain
2. decrease the affinity of hemoglobin with oxygen
3. release bicarbonate ions by the liver
4. reduce the rate of heart beat

60. Which one of the following statements is correct with respect to kidney function regulation?
1. Exposure to cold temperature stimulates ADH release
2. An increase in glomerular blood flow stimulates the formation of angiotensin II
3. During summer when the body loses a lot of water by evaporation, the release of ADH is suppressed
4. When someone drinks a lot of water ADH release is suppressed

61. Which of the following guards the opening of hepatopancreatic duct into the duodenum?
1. Ileocaecal valve
2. Pyloric sphincter
3. Sphincter of Oddi
4. Semilunar valve

62. 'Bundle of His' is a part of which one of the following organs in humans?
1. Heart
2. Kidney
3. Pancreas
4. Brain

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



1. B-pulmonary artery- takes blood from heart to lungs, PO_2 = 90mm Hg
2. C-Vena Cava- takes blood from body parts to rigjht auricle, PCO_2 = 40mm Hg
3. D-Dorsal aorta- takes blood from heart to body parts, PO_2 = 95mm Hg
4. A- pulmonary vein - takes impure blood from body parts, PO_2 = 60mm Hg

64. The “primary structure” of a protein refers to:
1. coiling due to hydrogen bonding between amino acids
2. the alpha helix or pleated sheets
3. the side groups of the amino acids
4. the number and sequence of amino acids

65. Similar adaptations in biologically unrelated species is:
1. stabilizing selection
2. convergent evolution
3. blending inheritance
4. natural selection

66. Which of the following is correct?
1. Physical change refers to change in shape without breaking the bonds
2. Change in state of matter also takes place in physical change
3. Chemical change involves breaking of old bonds and formation of new ones.
4. All of these

67. 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.	Ichthyophis	terrestrial	Reptilia
2.	Limulus	body covered by chitinous exoskeleton	Pisces
3.	Adamsia	radially symmetrical	Porifera
4.	Petromyzon	ectoparasite	Cyclostomata

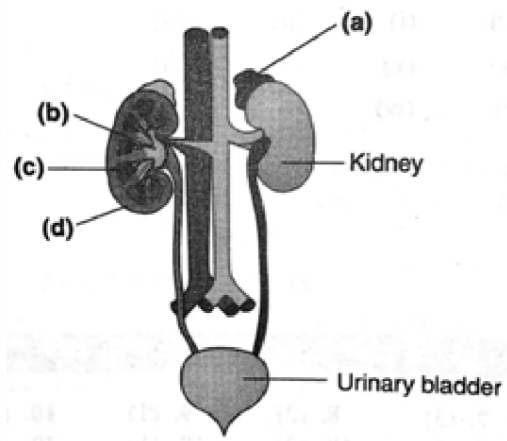
68. Which one of the following is a pair of viral diseases?
1. Ringworm, AIDS
2. Common Cold, AIDS
3. Dysentery, common cold
4. Typhoid, Tuberculosis

69. Which one of the following statements is correct with respect to immunity?
1. Preformed antibodies need to be injected to treat the bite by a viper snake
2. The antibodies against smallpox pathogen are produced by T - lymphocytes
3. Antibodies are protein molecules, each of which has four light chains
4. Rejection of a kidney graft is the function of B-lymphocytes

70. Select the correct statement from the following.
1. Mutations are random and directional.
2. Darwinian variations are small and directionless.
3. Fitness is the end result of the ability to adapt and get selected by nature.
4. All mammals except whales and camels have seven cervical vertebrae.

71. In human female, the blastocyst
1. Gets implanted into the uterus 3 days after ovulation.
2. Gets nutrition from uterine endometrial secretion only after implantation.
3. Gets implanted in endometrium by the trophoblast cells.
4. Forms placenta even before implantation.

72. 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. (a) Adrenal gland-located at the anterior part of kidney. Secretes catecholamines which stimulate glycogen break-down
2. (b) Pelvis-board funnel shaped space inner to hilum, directly connected to loops of Henle
3. (c) Medulla-inner zone of kidney and contains complete nephrons
4. (d) Cortex-outer part of kidney and do not contain any part of nephrons

73. Suppose the internal temperature of body is 36.5 degree celsius now what will be the temperature required for human spermatogenesis?
1. 34.2 degree Celsius
2. 33 degree Celsius
3. 38 degree Celsius
4. 38.2 degree Celsius

74. Select the statement(s) that relate to reproductive health:
1. Healthy reproductive organs with normal functions
2. Emotional aspects of reproduction
3. Social aspects of reproduction
4. All of the above

75. The slowly developing chronic inflammation of the organs in which they live for many years. Here they refers to
1. Filarial worms
2. Round worms
3. Ring worms
4. Entamoeba histolytica

76. Match the category of column l and that of column ll. Column ll below consists of brief description of organisms in column l.

Column l	**Column ll**
a. 	(i) It belongs to order chiropetera and is frugivorous
b. 	(ii) A jawless parasite vertebrate which attaches to and sucks blood from fishes
c. 	(iii) Prehensile tail and can show camaouflaging
d. 	(iii) Oviparous mamals, present in Australia and Tanzania

	(a)	(b)	(c)	(d)
1.	(ii)	(iv)	(i)	(iii)
2.	(iii)	(iv)	(ii)	(i)
3.	(iv)	(iii)	(i)	(ii)
4.	(iii)	(iv)	(i)	(ii)

77. Which of the following statements are suitable to vestibular apparatus?
I. It is responsible for maintenance of balance of the body and posture
II. It includes semi-circular canals and otolith organ
III. It is part of inner ear
IV. Cristae and maculae are specific receptors of this apparatus
1. I & III only
2. I & II only
3. II & IV only
4. I, II, III & IV

78. Following are some events occuring during muscle contraction. Arrange them in a sequence
a. Action potential of muscle fibre occurs.
b. Sarcoplasmic reticulum releases stored Ca^{+2} that binds with troponin component of thin filament.
c. Neurotransmitter released at neuromuscular junction.
d. Ca^{+2} is pumped back into SR and troponin mask the active site.
e. Actin molecules are exposed and cross bridges are formed.
1. c→ b → a → e →d
2. b → a →c → e →d
3. c → a → b → e →d
4. a → b → c → d →e

79. A major non contraceptive advantage of barrier contraceptive is
1. Spacing of pregnancies
2. Prevention of cancer breast in females
3. Regulation of menstrual flow
4. Prevention of sexually transmitted diseases

80. Prosthetic groups differ from co-enzymes in that
1. they require metal ions for their activity
2. they (prosthetic groups) are tightly bound to apoenzymes.
3. their association with apoenzymes is transient.
4. they can serve as co-factors in a number of enzyme-catalyzed reactions.

81. Select the correct statement.
1. Glucagon is associated with hypoglycemia.
2. Insulin acts on pancreatic cells and adipocytes.
3. Insulin is associated with hyperglycemia.
4. Glucocorticoids stimulate gluconeogenesis.

82. Read the following statements.
(a) Metagenesis is observed in Helminths.
(b) Echinoderms are triploblastic and coelomate animals.
(c) Round worms have organ-system level of body organization
(d) Comb plates present in ctenophores help in digestion.
(e) Water vascular system is characteristic of Echinoderms.
Choose the correct answer from the options given below.
1. (a), (d) and (e) are correct
2. (b), (c) and (e) are correct
3. (c), (d) and (e) are correct
4. (a), (b) and (c) are correct

83. Which of the following is not a step in Multiple Ovulation Embryo Transfer Technology (MOET)?
1. Cow is fertilized by artificial insemination
2. Fertilized eggs are transferred to surrogate mothers at 8-32 cell stage
3. Cow is administered hormone having LH like activity for super ovulation
4. Cow yields about 6-8 eggs at a time

84. Transport of gases in alveoli takes place by :
1. Active transport
2. Passive transport
3. Simple diffusion
4. None

85. Which of the following options correctly arranges the events of development of the foetus in its gestational period?
(a) Development of limbs and digits
(b) Major organ systems are formed
(c) Heart is formed
(d) Eye-lids separate
(e) Hair appear on the head
1. c → b a → d → e
2. b →c →a → e → d
3. c →a → b → e → d
4. a → d → e → c → b

Zoology - Section B

86. What is incorrect for Hemophilia?
1. In this disease, a single protein that is a part of the cascade of proteins involved in the clotting of blood is affected.
2. In an affected indlvidual a simple cut will result in non-stop bleeding.
3. The heterozygous female (carrier) for haemophilia may transmit the disease to sons.
4. The possibility of a female becoming a haemophilic is extremely rare because mother of such a female has to be hemophilic and the father should be a carrier.

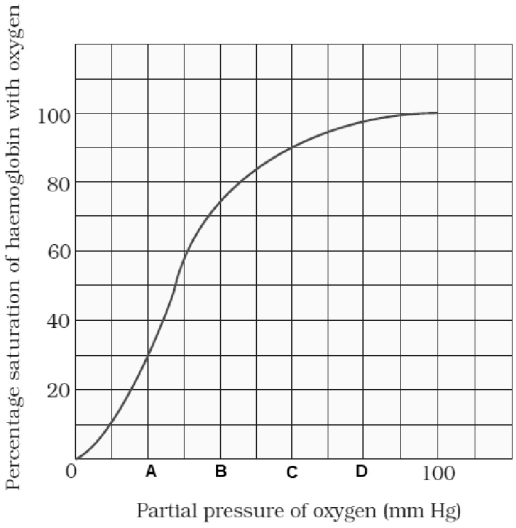
87. Identify the option where all the columns are not correctly matched:

1. Abrin	Secondary metabolite	Drug
2. GLUT-4	Protein	Transport carrier
3. Lecithin	Phospholipid	Cell membrane
4. Thymidylic Acid	Nucleotide	DNA

88. Which of the following is not a function of predators?
1. They act as conduits for energy transfer across trophic levels
2. They keep prey populations under control
3. They help in the stabilization of the ecosystems
4. They decrease the species diversity in a community

89. In the screening process during rDNA experiments, clones that metabolize β-gal turn:
1. Colorless
2. Blue
3. Yellow
4. Green

90. In the given diagram of the oxygen dissociation curve, under normal physiological conditions, the partial pressure of oxygen at the tissue level is represented by :



1. A
2. B
3. C
4. D

91. The terga sterna and pleura of cockroach body are joined by
1. cementing glue
2. muscular issue
3. arthrodial membrane
4. cartilage

92. What is true of natural methods of contraception?
1. They increase phagocytosis of sperms
2. They employ barriers to prevent fertilization
3. They are natural ways of avoiding chances of fertilization
4. They are surgical methods and are terminal methods

93. Which of the following statement is incorrect regarding the tissue lining organs and cavities?
1. They play a role of separating two structures from each other.
2. Cells are compactly packed with large intercellular space or matrix.
3. On the basis of number of cell layers present, they are classified as simple and stratified.
4. They are closely bound to each other through specialised structures called as tight junctions.

94. The structural and functional units of the liver are:
1. The four hepatic lobes containing the hepatic sinusoids lined by kupffer cells
2. The hepatic lobules containing hepatic cells arranged in the form of cords
3. The porta hepatis which carries the common bile duct and common hepatic artery, and the opening for the portal vein.
4. The right and the left lobes separated by the falciform ligament

95. Which of the following options shows the incorrect measurements of an adult human kidney?
1. 10-12 cm in length
2. Kidney weigh 240- 340 g
3. Thickness of kidney is 2-3 cm
4. 5-7 cm in width

96. Which of the following would not occur when we do physical exercises?

1. Increased energy demand
2. Increased oxygen supply and increased urine formation
3. Increased in the rate of respiration, heart beat
4. Increased blood flow via blood vessels

97. Name a peptide hormone which acts mainly on hepatocytes, adipocytes and enhances cellular glucose uptake and utilisation.
1. Insulin
2. Glucagon
3. Secretin
4. Gastrin

98. Name the blood cells, whose reduction in number can cause clotting disorder, leading to excessive loss of blood from the body.
1. Erythrocytes
2. Leucocytes
3. Neutrophils
4. Thrombocytes

99. Which of the following joints would allow no movement?
1. Fibrous joint
2. Cartilaginous joint
3. Synovial joint
4. Ball and socket joint

100. Which of the following cells during gametogenesis is normally diploid?
1. Primary polar body
2. Spermatid
3. Spermatogonia
4. Secondary polar body

Chemistry - Section A

101. Which one of the following is true for any diprotic acid, H_2X?
1. $K_{a2} = K_{a1}$
2. $K_{a1} > K_{a2}$
3. $K_{a1} < K_{a2}$
4. $K_{a1} = \frac{1}{K_{a2}}$

102. Decomposition of H_2O_2 is accelerated by:
1. traces of acids
2. finely divided metals
3. acetanilide
4. alcohol

103. The correct statement regarding the comparison of staggered and eclipsed conformations of ethane is
1. The eclipsed conformation of ethane is more stable than staggered conformation because eclipsed conformation has no torsional strain
2. The eclipsed conformation of ethane is more stable than staggered conformation even though the eclipsed conformation has a torsional strain
3. The staggered conformation of ethane is more stable than eclipsed conformation because staggered conformation has no torsional strain
4. The staggered conformation of ethane is less stable than eclipsed conformation because staggered conformation has the torsional strain

104. If the E_{cell} for a given reaction has a negative value, which of the following gives correct relationships for the values of ΔG^o and K_{eq}?
1. $\Delta G^o > 0;\ K_{eq} < 1$
2. $\Delta G^o > 0;\ K_{eq} > 1$
3. $\Delta G^o < 0;\ K_{eq} > 1$
4. $\Delta G^o < 0;\ K_{eq} < 1$

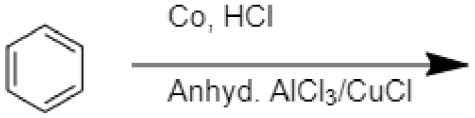
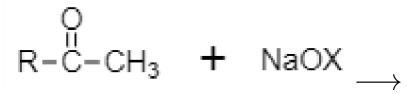
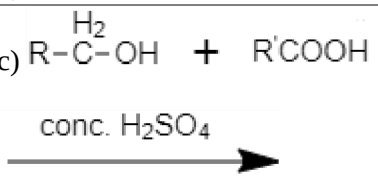
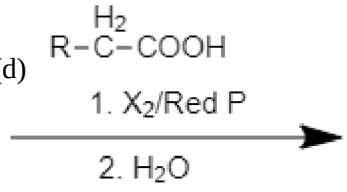
105. The correct statement among the following is-

1. Any aldehyde gives secondary alcohol on reduction.
2. Reaction of vegetable oil with H_2SO_4 give glycerin.
3. C_2H_5OH, and iodine with NaOH gives iodoform.
4. Sucrose on reaction with NaCl give invert sugar.

106. Which one of the following equations does not correctly represent the first law of thermodynamics for the given processes involving an ideal gas? (Assume non-expansion work is zero)
1. Adiabatic process : $\Delta U = -w$
2. Cyclic process: $q = -w$
3. Isothermal process: $q = -w$
4. Isochoric process: $\Delta U = q$

107. The number of pentagons in C_{60} and trigons (triangles) in white phosphorus, respectively, are :
1. 12 and 3
2. 20 and 3
3. 20 and 4
4. 12 and 4

108. Match List-I with List-II.

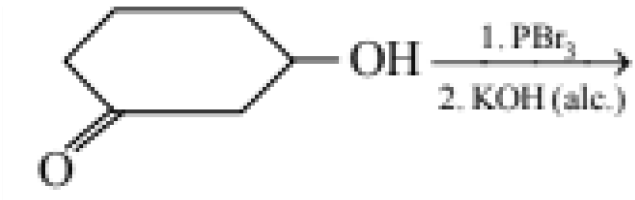
List-I	List-II
(a) 	(i) Hell-Volhard-Zelinsky reaction
(b) 	(ii) Gattermann-Koch reaction
(c) 	(iii) Haloform reaction
(d) 	(iv) Esterification

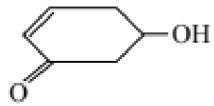
Choose the correct answer from the options given below.
1. (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)
2. (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
3. (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)
4. (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

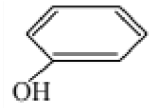
109. Molal depression constant for a solvent is 4.0 K kg mol^{-1} . The depression in the freezing point of the solvent for 0.03 mol kg^{-1} solution of K_2SO_4 is : (Assume complete dissociation of the electrolyte)

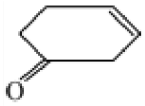
1. 0.36 K
2. 0.18 K
3. 0.12 K
4. 0.24 K

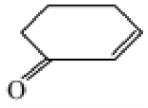
110. The major product (A) of the following reaction is-



1. 

2. 

3. 

4. 

111. Consider the van der Waals constants, a and b, for the following gases.

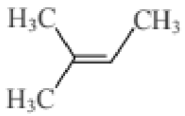
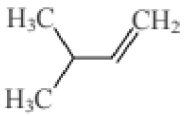
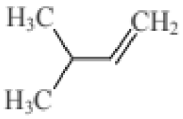
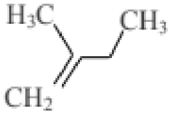
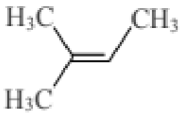
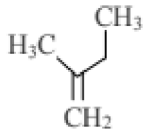
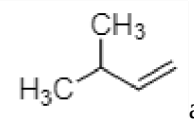
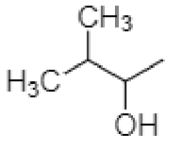
Gas	Ar	Ne	Kr	Xe
a/(atm dm^6 mol^{-2})	1.3	0.2	5.1	4.1
b/($10^{-2}$$dm^3$ mol^{-1})	3.2	1.7	1.0	5.0

Which gas is expected to have the highest critical temperature?
1. Xe
2. Ne
3. Kr
4. Ar

112. Assertion (A): Vinyl halides do not undergo nucleophilic substitution easily.
Reason (R): Even though the intermediate carbocation is stabilized by loosely held p-electrons, the cleavage is difficult because of strong bonding.
1. Both (A) and (R) are correct statements but (R) is not the correct explanation of (A)
2. Both (A) and (R) are correct statements and (R) is the correct explanation of (A)
3. (A) is a correct statement but (R) is a wrong statement
4. Both (A) and (R) are wrong statements.

113. The INCORRECT statement is :
1. Lithium is least reactive with water among the alkali metals
2. LiCl crystallises from aqueous solution as $LiCl.2H_2O$
3. Lithium is the strongest reducing agent among the alkali metals
4. $LiNO_3$ decomposes on heating to give $LiNO_2$ and O_2

114. When neopentyl alcohol is heated with an acid, it slowly converted into an 85 : 15 mixture of alkenes A and B, respectively. What are these alkenes ?

1.  and 
2.  and 
3.  and 
4.  and 

115. Which of the following is not an essential amino acid :

1. Valine
2. Leucine
3. Lysine
4. Tyrosine

116. What is the correct sequence of reagents used for converting nitrobenzene into m-dibromobenzene ?

1. $\xrightarrow{NaNO_2} / \xrightarrow{HCl} / \xrightarrow{KBr} / \xrightarrow{H^+}$
2. $\xrightarrow{Br_2/Fe} / \xrightarrow{Sn/HCl} / \xrightarrow{NaNO_2/HCl} / \xrightarrow{CuBr/HBr}$
3. $\xrightarrow{Sn/HCl} / \xrightarrow{KBr} / \xrightarrow{Br_2} / \xrightarrow{H^+}$
4. $\xrightarrow{Sn/HCl} / \xrightarrow{Br_2} / \xrightarrow{NaNO_2} / \xrightarrow{NaBr}$

117. Arrange the following solution in the decreasing order of pOH :

(A). 0.01 M HCl
(B). 0.01 M NaOH
(C). 0.01 M CH_3COONa
(D). 0.01 M NaCl

1. (B) > (C) > (D) > (A)
2. (A) > (C) > (D) > (B)
3. (B) > (D) > (C) > (A)
4. (A) > (D) > (C) > (B)

118. The correct statement with respect to dinitrogen is -

1. It can be used as an inert diluent for reactive chemicals
2. It can combine with dioxygen at 25°C
3. N_2 is paramagnetic in nature
4. Liquid dinitrogen is not used in cryosurgery

119. Among the following reactions, the reaction will not form acetaldehyde is-

1. $CH_3CH_2OH \xrightarrow[573\ K]{Cu}$
2. $CH_3CN \xrightarrow[(ii)\ H_2O]{(i)\ DIBAL\ H}$
3. $CH_2 = CH_2 + O_2 \xrightarrow[H_2O]{Pd(II)/Cu(II)}$
4. $CH_3CH_2OH \xrightarrow{CrO_3 - H_2SO_4}$

120. For a d^4 metal ion in an octahedral field, the correct electronic configuration is :

1. $t_{2g}^4 e_g^0$ *when* $\Delta_O < P$
2. $e_{2g}^2 t_g^2$ *when* $\Delta_O < P$
3. $t_{2g}^3 e_g^1$ *when* $\Delta_O < P$
4. $t_{2g}^3 e_g^1$ when $\Delta_O > P$

121. Consider the reaction:

$$4NO_{2(g)} + O_{2(g)} \rightarrow 2N_2O_{5(g)} \quad \Delta_rH = -111\ kJ$$

If $N_2O_{5(s)}$ is formed instead of $N_2O_{5(g)}$ in the above reaction, the Δ_rH value will be :

(given, ΔH of sublimation for N_2O_5 is 54 kJ mol^{-1})

1. +54 kJ
2. + 219 kJ
3. -219 kJ
4. -165 kJ

122. In which of the following arrangements, the sequence is not strictly according to the property written against it?

1. $CO_2 < SiO_2 < SnO_2 < PbO_2$: increasing oxidising power
2. HF < HCl < HBr < HI : increasing acid strength
3. $NH_3 < PH_3 < AsH_3 < SbH_3$: increasing basic strength
4. B < C < O < N : increasing first ionization enthalpy

123. In an atom, an electron is moving at a speed of 600 m/s with an accuracy of 0.005%. Certainty with which the position of the electron can be located is

(h = 6.6×10^{-34} kg m^2 s^{-1}, mass of electron, e_m = 9.1×10^{-31} kg) :

1. 1.52×10^{-4} m
2. 5.10×10^{-3} m
3. 1.92×10^{-3} m
4. 3.84×10^{-3} m

124. 0.1 mole of a carbohydrate with empirical formula CH_2O contains 1 g of hydrogen. What is its molecular formula?
1. $C_5H_{10}O_5$
2. $C_6H_{12}O_6$
3. $C_4H_8O_4$
4. $C_3H_6O_3$

125. Of the following sets which one does not contain isoelectronic species?
1. BO_3^{3-}, CO_3^{2-}, NO_3^-
2. SO_3^{2-}, CO_3^{2-}, NO_3^-
3. CN^-, N_2, C_2^{2-}
4. PO_4^{3-}, SO_4^{2-}, ClO_4^-

126. Amongst the following elements the configuration having the highest ionization energy is:
1. $[Ne]3s^23p^1$
2. $[Ne]3s^23p^3$
3. $[Ne]3s^23p^2$
4. $[Ar]3d^{10}4s^24p^3$

127. Which of the following group of transition metals is called coinage metals ?
1. Cu , Ag, Au
2. Ru , Rh, Pd
3. Fe , Co , Ni
4. Os , Ir , Pt

128. In the anion $HCOO^-$ the two carbon-oxygen bonds are found to be of equal length. What is the reason for it?
1. Electronic orbits of the carbon atom are hybridized
2. The C = O bond is weaker than the C - O bond
3. The anion $HCOO^-$ has two resonating structures
4. The anion is obtained by removal of a proton from the acid molecule

129. In the reaction,

$$xHI + yHNO_3 \rightarrow NO + I_2 + H_2O$$

1. $x = 3, y = 2$
2. $x = 2, y = 3$
3. $x = 6, y = 2$
4. $x = 6, y = 1$

130. Amongst the following, the most basic compound is-

1. $C_6H_5NH_2$
2. $p - NO_2 - C_6H_4NH_2$
3. $m - NO_2 - C_6H_4NH_2$
4. $C_6H_5CH_2NH_2$

131. The correct IUPAC name of $Mn_3(CO)_{12}$ is-
1. dodecacarbonyl manganate(0)
2. dodecacarbonyl manganese(0)
3. dodecacarbonyl trimanganese(0)
4. Manganic dodecacarbonyl(0)

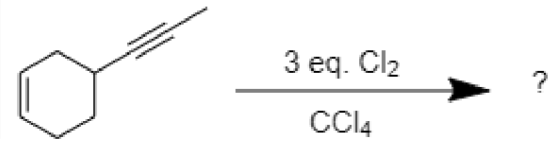
132. The correct statement regarding dry cells among the following is-

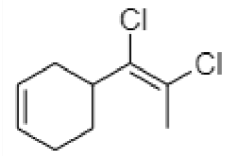
a. It is also known as Leclanche cell
b. The electrolyte is a moist paste of ammonium chloride (NH_4Cl) and zinc chloride ($ZnCl_2$).
c. The cathodic reaction is : $MnO_2 + NH_4^+ + e^- \rightarrow MnO(OH) + NH_3$

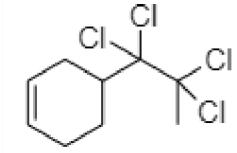
1. Only a, and b are correct
2. Only c is correct
3. Only b, and c is correct
4. All are the correct statement

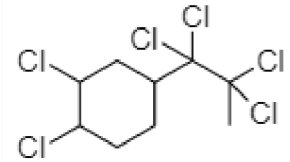
133. Choose the wrong statement.
1. CO_2 is responsible for the greenhouse effect
2. Normally the pH of rainwater is about 5.6
3. Acid rain mainly contains HNO_3.
4. Pollen grains are also considered air pollutants.

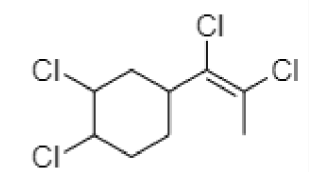
134. The major product of the following reaction is -



1. 

2. 

3. 

4. 

135. Which of the following statements is not true for the rate constant, k?

1. large value of k indicates fast reactions.
2. The value of k is independent of the concentration of reactants
3. The value of k is independent of the concentration of products
4. The value of the rate constant, k, as the name suggests is always constant for a particular reaction at all temperatures.

Chemistry - Section B

136. Which of the species has the maximum number of lone pairs of electrons on the central atom?

1. $XeOF_4$
2. IF_4^+
3. XeF_2
4. BrF_3

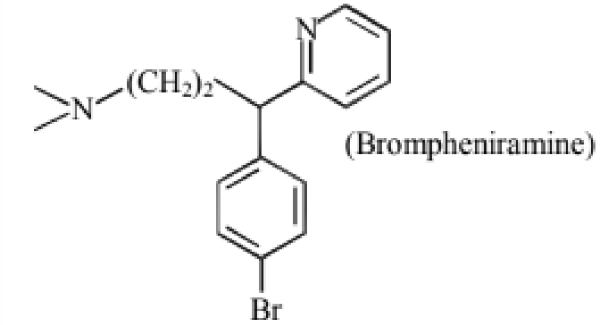
137. Oxidation number of P in pyrophosphoric acid is :

1. + 5
2. + 2
3. + 3
4. + 4

138. An element with molar mass 2.7×10^{-2} kg mol^{-1} forms cubic unit cell with edge length 405 pm. If its density is 2.7×10^3 kg m^{-3} , the radius of the element in $\times 10^{-12}$ m is approximately-

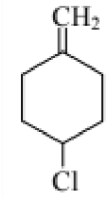
1. 148
2. 143
3. 140
4. 152

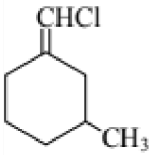
139. The following molecule acts as an-

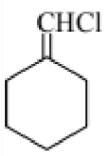


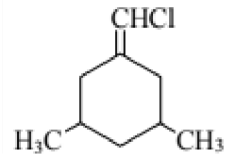
1. Antiseptic
2. Anti-bacterial
3. Anti-histamine
4. Anti-depressant

140. Among the following compounds, geometrical isomerism is exhibited by -

1. 

2. 

3. 

4. 

141. The polymers is not obtained by condensation polymerisation among the following is-

1. Buna - N
2. Bakelite
3. Nylon 6
4. Nylon 6, 6

142. Kraft temperature is the temperature -

1. Below which the formation of micelles takes place
2. Below which the aqueous solution of detergents starts freezing
3. Above which the aqueous solution of detergents starts boiling
4. Above which the formation of micelles takes place

143. Lanthanoids does not form MO_2 among the following is-[M is lanthanoid metal]

1. Pr
2. Dy
3. Nd
4. Yb

144. Two reactions, R_1 and R_2 have identical pre-exponential factors. Activation energy of R_1 exceeds that of R_2 by 10 kJ mol^{-1}. If k_1 and k_2 are rate constants for reactions R_1 and R_2 respectively at 300 K, then $\ln(k_2/k_1)$ is equal to.
($R = 8.314$ J mol^{-1} K^{-1}).
1. 6
2. 4
3. 8
4. 12

145. On mixing, heptane, and octane form an ideal solution at 373 K, the vapor pressures of the two liquid components (Heptane and octane) are 105 kPa and 45 kPa respectively. Vapour pressure of the solution obtained by mixing 25.0 g of heptane and 35 g of octane will be (molar mass of heptane = 100 g mol^{-1} and of octane =114 g 1 mol^{-1})
1. 144.5 kPa
2. 72.0 kPa
3. 36.1 kPa
4. 96.2 kPa

146. The correct order of acid strength of the following compounds:
A. Phenol
B. p-Cresol
C. m-Nitrophenol
D. p-Nitrophenol
is
1. D > C > A > B
2. B > D > A > C
3. A > B > D > C
4. C > B > A > D

147. In a saturated solution of the sparingly soluble electrolyte $AgIO_3$ (molecular mass = 283) the equilibrium which sets in is –
$AgIO_3((s)) \rightleftharpoons Ag^+((aq)) + IO_3^-((aq))$
If the solubility product constant K_{sp} of $AgIO_3$ at a given temperature is 1.0×10^{-8}, what is the mass of $AgIO_3$ contained in 100 ml of its saturated solution?
1. 28.3×10^{-2} g
2. 2.83×10^{-3} g
3. 1.0×10^{-7} g
4. 1.0×10^{-4} g

148. The increasing order of the rate of HCN addition to compounds A-D is :
A. HCHO
B. CH_3COCH_3
C. $PhCOCH_3$
D. PhCOPh
1. A < B < C < D
2. D < B < C < A
3. D < C <B < A
4. C < D < B < A

149. Which one of the following complexes is an outer orbital complex?
(Atomic number Mn=25, Fe=26, Co=27, Ni=28)
1. $[Fe(CN)_6]^{4-}$
2. $[Mn(CN)_6]^{4-}$
3. $[Co(NH_3)_6]^{3+}$
4. $[Ni(NH_3)_6]^{2+}$

150. Extraction of zinc from zinc blende is achieved by:

1. Electrolytic reduction
2. Roasting followed by reduction with carbon
3. Roasting followed by reduction with another metal
4. Roasting followed by self reduction

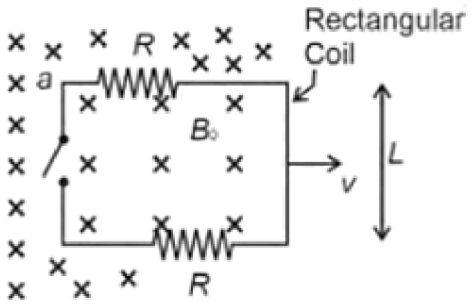
Physics - Section A

151. Maxwell unified:
1. electricity and gravitation.
2. electricity and magnetism.
3. electromagnetism with weak nuclear forces.
4. electromagnetism with optics.

152. The dimensions of Wien's constant are:
1. [MLTK]
2. $[M^0LT^0K]$
3. $[M^0L^0TK]$
4. $[MLTK^{-1}]$

153. Maxwell is a unit of:
1. magnetic susceptibility.
2. magnetic flux.
3. magnetic permeability.
4. magnetic dipole moment.

154. Magnetic field B_0 exists perpendicular to the coil plane as shown in the figure. The coil is coming out of the magnetic field at a steady speed. When the key is closed, the instantaneous current in the circuit is:



1. $\frac{B_0 L v}{R}$
2. $\frac{B_0 L v}{2R}$
3. $\frac{2B_0 L v}{R}$
4. zero

155. At the first minimum adjacent to the central maximum of a single slit diffraction pattern, the phase difference between the Huygens wavefront from the edge of the slit and the wavefront from the midpoint of the slit is:

1. $\frac{\pi}{4}$ radian
2. $\frac{\pi}{2}$ radian
3. π radian
4. $\frac{3\pi}{2}$ radian

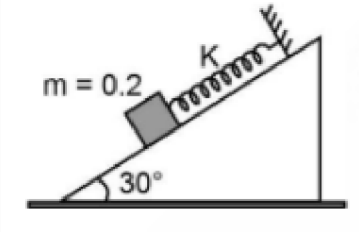
156. A Cheetah can accelerate from 0 to 96 km/h in 2 sec. What is the average acceleration of the Cheetah?

1. 10 m/s^2
2. 13.3 m/s^2
3. 15 m/s^2
4. 48 m/s^2

157. The objective lens of a compound microscope as compared to an eyepiece is essential:

1. a concave lens of small focal length and small aperture
2. a convex lens of small focal length and large aperture
3. a convex lens of small focal length and small aperture
4. a convex lens of large focal length and large aperture

158. A block of mass 0.2 kg slides without friction on a 30° incline and is connected at the top by a massless spring of spring constant 80 N/m as shown. If the block is pulled slightly down the incline and released, the time period of the ensuing motion is:



1. $\frac{\pi}{2}$ s
2. $\frac{\pi}{5}$ s
3. $\frac{\pi}{10}$ s
4. $\frac{\pi}{4}$ s

159. The power delivered by a magnetic field on a moving charged particle is:

1. zero because magnetic force $\vec{F}_m$acts parallel to $\vec{v}$.
2. positive because magnetic force $\vec{F}_m$acts parallel to $\vec{v}$.
3. negative because magnetic force $\vec{F}_m$acts opposite to $\vec{v}$.
4. zero because magnetic force $\vec{F}_m$acts perpendicular to $\vec{v}$.

160. A particle of mass m is projected with initial velocity u at an angle θ with the vertical. The maximum height reached by the particle is:

1. $\frac{u^2 \sin^2\theta}{2g}$
2. $\frac{u^2 \sin^2\theta}{g}$
3. $\frac{u^2 \cos^2\theta}{2g}$
4. $\frac{u^2 \cos^2\theta}{g}$

161. A parallel plate capacitor with air as a medium between the plates has a capacitance of 10 μF. The area of the capacitor is divided into two equal halves and filled with two media having dielectric constants K_1 = 2 and K_2 = 4. The capacitance of the new system will be:

1. 10 μF
2. 20 μF
3. 30 μF
4. 40 μF

162. The focal length of a convex lens will be maximum for:

1. blue light
2. yellow light
3. green light
4. red light

163. The photoelectric effect for a photosensitive plate only occurs when the wavelength of light λ is less than a certain wavelength λ_o . Then the work function of the metal is:
1. $\frac{hc}{3\lambda_0}$
2. $\frac{hc}{2\lambda_0}$
3. $\frac{hc}{\lambda_0}$
4. $\frac{2hc}{\lambda_0}$

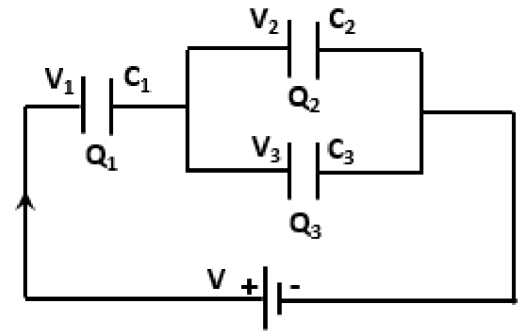
164. Of the following atoms;
${}_6C^{14}, {}_7N^{13}, {}_{88}Ra^{236}, {}_7N^{14}, {}_8O^{16}$ and ${}_{86}Rn^{232}$,
a pair of isobars is:
1. ${}_6C^{11}, {}_7N^{13}$
2. ${}_7N^{13}, {}_7N^{14}$
3. ${}_6C^{14}, {}_7N^{14}$
4. ${}_6C^{14}, {}_8O^{16}$

165. The depletion layer in the p-n junction consists of:
1. electrons.
2. holes.
3. positive and negative ions fixed in their position.
4. both electrons and holes.

166. A cube of mass M with side a slides down a rough inclined plane of inclination θ with a uniform velocity. The torque of friction on the block about its centre has a magnitude:
1. zero
2. Mga
3. $Mga\ sin\ \theta$
4. $\frac{Mga\sin\theta}{2}$

167. A simple pendulum of length L has an energy E and amplitude A. The energies of the simple pendulum (i) when the length is doubled but with the same amplitude and (ii) when the amplitude is doubled but with the same length, are respectively:
1. $2E,\ 2E$
2. $\frac{E}{2}, \frac{E}{2}$
3. $\frac{E}{2},\ 2E$
4. $\frac{E}{2}, 4E$

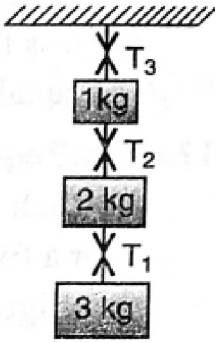
168. There are three capacitors C_1, C_2 and C_3 connected to a battery with symbols having their usual meanings. Then the correct relation between V_2 and V_3 is:



1. $V_2 = V_3$
2. $V_2 < V_3$
3. $V_2 > V_3$
4. $2V_1 = V_2 + V_3$

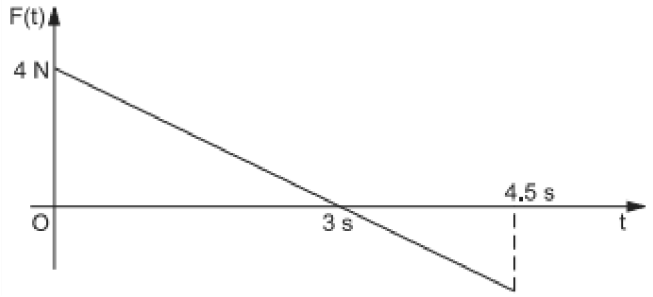
169. Consider the following statement. The internal energy of an ideal monoatomic gas may have contributions from:
(1) translational kinetic energy of its molecules
(2) vibrational kinetic energy of its molecules
(3) rotational kinetic energy of its molecules
(4) potential energy corresponding to molecular forces
Which of the statements given above is/are correct?
1. 2 and 3
2. 1 and 4
3. 1 only
4. 1,2,3 and 4

170. In the system shown in the adjoining figure, the tension T_2 is:



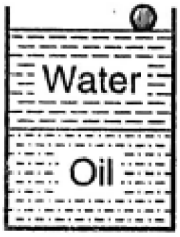
1. g
2. 2g
3. 5g
4. 6g

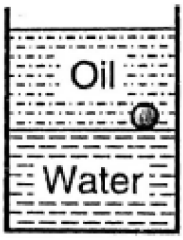
171. A block of mass 2 kg is free to move along the x-axis. It is at rest and from t = 0 onwards it is subjected to a time-dependent force F(t) in the X-direction. The force F(t) varies with t as shown in the figure. The kinetic energy of the block after 4.5 s is:

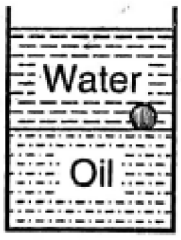


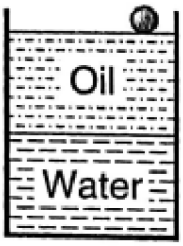
1. 4.50 J
2. 7.50 J
3. 5.06 J
4. 14.06 J

172. A ball is made of a material of density ρ where $\rho_{oil}<\rho<\rho_{water}$ with ρ_{oil} and ρ_{water} representing the densities of oil and water, respectively. The oil and water are immiscible. If the above ball is in equilibrium in a mixture of this oil and water, which of the following pictures represents its equilibrium position?

1. 

2. 

3. 

4. 

173. The thermodynamic process in which no work is done on or by the gas is:
1. adiabatic process
2. cyclic process
3. isobaric process
4. isochoric process

174. When air medium in which two charges kept apart at a distance r is replaced by a dielectric medium of dielectric constant K, the force between the charges:
1. remains unchanged
2. decreases K times
3. increases K times
4. increases K^2 times

175. As the quantum number increases, the difference of energy between consecutive energy levels:
1. decreases
2. increases
3. first decreases and then increases
4. remains the same

176. A satellite orbiting around Earth has potential energy E. Then the kinetic energy is:
1. -E/4
2. -E/3
3. -E/2
4. -E

177. A stretched rubber has:
1. increased K.E
2. increased P.E
3. decreased K.E
4. decreased P.E

178. Given that $\vec{F} = 2\hat{i} + 3\hat{j}$ is force and $\vec{r} = 3\hat{i} - 2\hat{j}$ is the displacement position vector. Which of the following statements is correct?
1. Work done is zero, torque is 13 units
2. Work done is 13 units, torque is zero
3. Both work and torque are zero
4. Both work and torque are 13 units

179. A bullet when fired at a target has its velocity decreased by 50% after penetrating 30 cm into it. Then, the additional thickness that it will penetrate (in cm) before coming to rest is:
1. 10
2. 30
3. 40
4. 60

180. S_1 and S_2 are two stationary sound sources of frequencies 400 Hz and 450 Hz respectively, placed at a good distance from each other. An observer is present between the line joining the sources. To minimize the beats, the observer should move with constant speed:
1. towards source S_1
2. towards source S_2
3. should not move
4. can't say

181. Two SHMs have equations:
$x_1 = a\sin(\omega t + \phi_1)$ and $x_2 = a\sin(\omega t + \phi_2)$.
If the amplitude of the resultant SHM is equal to amplitude of superimposing SHM(s), the phase difference between them is:

1. $\frac{\pi}{6}$
2. $\frac{2\pi}{3}$
3. $\frac{\pi}{4}$
4. $\frac{\pi}{3}$

182. Two concentric spherical shells of radii R and r have similar charges with equal surface densities (σ). What is the electric potential at their common centre?
1. σ/ε_0
2. $\frac{\sigma}{\varepsilon_0}(R-r)$
3. $\frac{\sigma}{\varepsilon_0}(R+r)$
4. None of these

183. A satellite moving around the earth in a circular orbit of radius r and speed v suddenly loses some of its energy. Then:
1. r will increase and v will decrease
2. both r and v will decrease
3. r will decrease and v will increase
4. none of the above

184. If the electric field is given by $\left(5\hat{i} + 4\hat{j} + 9\hat{k}\right)$, the electric flux through a surface of area 20 unit lying in the Y-Z plane will be:
1. 100 unit
2. 80 unit
3. 180 unit
4. 20 unit

185. Polaroid glass is used in sun glasses because:
1. it reduces the light intensity to half on account of polarisation
2. it is fashionable
3. it has good colour
4. it is cheaper

Physics - Section B

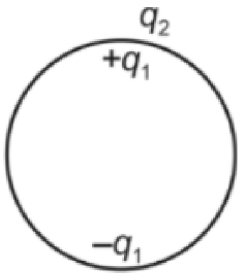
186. In an ac circuit, alternating current is given as I = 3sin ωt + 4 cos ωt . The RMS value of current is:
(1) $\frac{3}{\sqrt{2}}$ A
(2) $\frac{4}{\sqrt{2}}$ A
(3) $\frac{5}{\sqrt{2}}$ A
(4) $\frac{7}{\sqrt{2}}$ A

187. A particle of mass m=0.1 kg is held between two rigid supports by two spring constants 8 N/m and 2 N/m. If the particle is displaced slightly along the direction of length of the springs and released, the frequency of oscillation is:
1. $\frac{5}{\pi}$ Hz
2. $\frac{10}{\pi}$ Hz
3. $\frac{2}{\pi}$ Hz
4. $\frac{1}{\pi}$ Hz

188. The length of a given conducting wire is increased by 100% due to stretching. Due to consequent decrease in diameter, the change in the resistance of the wire will be:
1. 100%
2. 200%
3. 300%
4. 400%

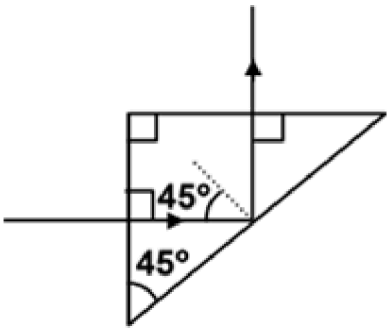
189. A conductor carries a certain charge. When it is connected to another initially uncharged conductor of finite capacity, then the final energy of the combined system is:
1. more than that of the first conductor
2. less than that of the first conductor
3. equal to that of the first conductor
4. more or less depends on the shape of the conductor

190. Consider the charge configuration and a spherical Gaussian surface as shown in the figure. When calculating the flux of the electric field over the spherical surface, the electric field will be due to:



1. q_2
2. only the positive charges
3. all the charges
4. $+q_1$ and $-q_1$

191. A light ray is incident perpendicular to one face of a 90^o prism and is totally internally reflected at the glass-air interface. If the angle of reflection is 45^o, we conclude that the refractive index n is:



1. $n < \frac{1}{\sqrt{2}}$
2. $n > \sqrt{2}$
3. $n > \frac{1}{\sqrt{2}}$
4. $n < \sqrt{2}$

192. A YDSE setup is first performed in air and then a liquid of refractive index μ . At a particular location on screen, the 10th bright fringe in air and the 12th bright fringe in liquid coincide. Then μ is:

1. 1.8
2. 1.54
3. 1.67
4. 1.2

193. If the rms velocity of a gas is v, then:

1. v^2T = constant
2. v^2/T = constant
3. vT^2 = constant
4. v is independent of T

194. A body cools from 62^oC to 50^oC in 10 minutes and to 42^oC in the next 10 minutes. The temperature of the surrounding is:

1. 16 ^oC
2. 26 ^oC
3. 36 ^oC
4. 21 ^oC

195. If K_1 and K_2 are the maximum kinetic energies of photoelectrons emitted when lights of wavelength λ_1 and λ_2 respectively are incident on a metallic surface and $\lambda_1 = 3\lambda_2$, then:

1. $K_1 > \frac{K_2}{3}$
2. $K_1 < \frac{K_2}{3}$
3. $K_1 = 3K_2$
4. $K_2 = 3K_1$

196. A piece of wood floats in water kept in a beaker. If the beaker moves with a vertical acceleration a, the wood will:

1. sink deeper in the liquid if a is upward
2. sink deeper in the liquid if a is downward, with a<g
3. come out more from the liquid if a is downward with a<g
4. remain in the same position relative to the water

197. A body is moved in a vertical circle of radius R with the help of a string. It is projected with speed $\sqrt{5gR}$ at the lowest point. The string breaks when the body is at the highest point. What is the horizontal distance covered by the body after the string breaks? [Assume the lowest point of circular motion is at ground level.]

1. 2R
2. R
3. $R\sqrt{2}$
4. 4R

198. The ratio of the radii of gyration of a spherical shell and a solid sphere of the same mass and radius about a tangential axis is $\frac{n}{\sqrt{21}}$. Then the value of n will be:

1. $\sqrt{3}$
2. $\sqrt{12}$
3. 1
4. 5

199. The half-life period of a radioactive element is 10 days. Then, how long does it take for 90% of a given mass of this element to disintegrate?

1. 19 days
2. 27 days
3. 33 days
4. 37 days

200. The angular momentum of a particle performing uniform circular motion is L. If the kinetic energy of the particle is doubled and frequency is halved, then angular momentum becomes:

1. $\frac{L}{2}$
2. $2L$
3. $\frac{L}{4}$
4. $4L$

Fill OMR Sheet*

*If above link doesn't work, please go to test link from where you got the pdf and fill OMR from there. After filling the OMR, you would get answers and explanations for the questions in the test.