1.

The rate of a first-order reaction is 0.04 mol l^{-1} s^{-1} at 10 seconds and 0.03 mol l^{-1} s^{-1} at 20 seconds after initiation of the reaction. The half-life period of the reaction is:

1. 44.1 s
2. 54.1 s
3. 24.1 s
4. 34.1 s

2.

Which of the following characteristic features always holds true for the corresponding group of animals?

(a) Viviparous	(1) Mammalia
(b) Possess a mouth with an upper and a lower jaw	(2) Chordata
(c) 3-chambered heart with one incompletely Divided ventricle	(3) Reptilia
(d) Cartilaginous-Endoskeleton	(4) Chondrichthyes

1. a
2. b
3. c
4. d

3.

Changes in GnRH pulse frequency in females is controlled by circulating levels of

1. estrogen and inhibin
2. progesterone only
3. progesterone and inhibin
4. estrogen and progesterone

4.

Microtubules are the constituents of

1. spindle fibres, centrioles and cilia
2. centrioles, spindle fibres and chromatin
3. centrosome, nucleosome and centrioles
4. cilia, flagella and peroxisomes

5.

Mitochondria and chloroplast are

I. semi-autonomous organelles.

II. formed by division of pre-existing organelles and they contain DNA but lack protein synthesizing machinery.

Which one of the following options is correct?

1. II is true but I is false
2. I is true but II is false
3. Both I and II are false
4. Both I and II are correct

6.

Photosensitive compound in human eye is made up of

1. opsin and Retinal
2. opsin and Retinol
3. transducin and Retinene
4. guanosine and Retinol

7.

Chrysophytes, euglenoids, dinoflagellates and slime moulds are included in the kingdom

1. Protista
2. Fungi
3. Animalia
4. Monera

8.

The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animal, include the

1. thermoacidophiles
2. methanogens
3. eubacteria
4. halophiles

9.

Identify the correct statement on 'inhibin'

1. Is produced by granulosa cells in ovary and inhibits the secretion of FSH
2. Is produced by granulosa cells in ovary and inhibits the secretion of LH
3. Is produced by nurse cells in testes and inhibits the secretion of LH
4. In hibits the secretion of LH, FSH and prolactin.

10.

It is much easier for a small animal to run Uphill than for a large animal, because

1. smaller animals have a higher metabolic
2. small animals have a lower O_2 requirement
3. the efficiency of muscles in large animals is less than in the small animals
4. it is easier to carry a small body weight

11.

A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the F1 plants were selfed the resulting genotypes were in the ratio of

1. 1:2:1 :: Tall heterozygous : Tall homozygous : Drawf
2. 3:1 :: Tall : Dwarf
3. 3:1:: Dwarf : Tall
4. 1:2:1:: Tall homozygous : Tall heterozygous : Dwarf

12.
Depletion of which gas in the atmosphere can lead to an increased of skin cancers
1. ozone
2. ammonia
3. methane
4. nitrous oxide

13.
Which one of the following is a characterstics feature of cropland ecosystem?
1. Least genetic diversity
2. The absence of weeds
3. Ecological succession
4. The absence of soil organisms

14.
Tricarpellary, syncarpous is found in flowers of
1. Solanaceae
2. Fabaceae
3. Poaceae
4. Liliaceae

15.
In which of the following, all three are macronutrients?
1. Iron, copper, molybdenum
2. Molybdenum, magnesium, manganese
3. Nitrogen, zinc, manganese
4. Nitrogen, phosphorus, nickle

16.
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

17.
Lack of relaxation between successive stimuli in sustained muscle contraction is known as
1. fatigue
2. tetanus
3. tonus
4. spasm

18.
Which one of the following statements is wrong?
1. Golden algae are also called desmids
2. Eubacteria are also called false bacteria.
3. Phycomycetes are also called algal fungi.
4. Cyanobacteria are also called blue-green algae.

19.
Which of the following is a restriction endonuclease?
1. Protease
2. DNase I
3. RNase
4. Hind II

20.
Which of the following would appear as the pioneer organisms on bare rocks?
1. Liverworts
2. Mosses
3. Green algae
4. Lichens

21.
Water vapour comes out from the plant leaf through the stomatal opening. Through the same stomatal opening, carbon dioxide diffuses into the plant during photosynthesis. Reason out the above statements using the following options.
1. Both processes can happen together because the diffusion coefficient of water and CO2 is different
2. The above processes happen only during night time.
3. One process occurs happen only day time and the other at night
4. Both process cannot happen simulataneously

22.
Cotyledon of maize grain is called
1. coleorhizae
2. coleopite
3. scutellum
4. plumule

23.
Which of the following guards the opening of hepatopancereatic duct into the duodenum ?
1. Ileocaecal valve
2. Pyloric sphincter
3. Sphincter of Oddi
4. Semilunar valve

24.
In the stomach, gastric acid is secreted by the
1. oxyntic cells
2. peptic cells
3. acidic cells
4. gastrin secreting cells

25.
In mammals, which blood vessel which would normally carry largest amount of urea?
1. Dorsal Aorta
2. Hepatic Vein
3. Hepatic Portal Vein
4. Renal Vein

26.
The term ecosystem was coined by
1. A.G. Tansley
2. E. Haeckel
3. E. warming
4. E.P. Odum

27.
Which of the following s required as inducer (s) for the expression of lac operon ?
1. galactose
2. lactose
3. lactose and galactose
4. glucose

28.
Which of the following is wrongly matched in the given table ?

	Microbe	Product	Application
a	Monascus purpureus	Statins	Lowering of blood cholesterol
b	Streptococcus	Streptokinase	Removal of clot from blood vessel
c	Clostridium butylicum	Lipase	Removal of oil stains
D	Trichoderma polysporum	Cyclosporin –A	Immunosuppressive drug

1. a
2. b
3. c
4. d

29.
When does the growth rate of a population following the logistic model equal zero? The logistic model is given as dN/dt = rN(1-N/K)
1. when N nears the carrying capacity of the habitat
2. when N/K equals zero
3. when death rate is greater than birth rate
4. when N/K is exactly one

30.
Which one of the following statements is not true?
1. Exine of pollen grains is made up of sporopollenin
2. Pollen grains of many species cause severe allergies
3. Stored pollen in liquid nitrogen can used in the crop breeding programs
4. Tapetum helps in the dehiscence of anther

31.
In bryophytes and pteridophytes, transport of male gametes requires
1. insects
2. birds
3. water
4. wind

32.
Which of the following is not a stem modification?
1. Thorns of citrus
2. Tendrils of cucumber
3. Flattened structure of Opuntia
4. Pitcher of Nepenthes

33.
Which one of the following cell organelles is enclosed by a single membrane?
1. Chloroplasts
2. Lysosomes
3. Nuclei
4. Mitochondria

34.
Analogous structure are results of
1. convergent evolution
2. shared ancestry
3. stabilizing selection
4. divergent evolution

35.
Which one of the following statements is wrong?
1. Cellulose is a polysaccharide
2. Uracil is a pyrimidine
3. Glycine is a sulphur containing amino acid
4. Sucrose is a disaccharide

36.
Proximal end of the filament of stamen is attached to the
1. connective
2. placenta
3. thalamus or petal
4. anther

37.
Which of the following is not required for any of the techniques of DNA fingerprinting available at present?
1. Zinc finger analysis
2. Restriction enzymes
3. DNA –DNA hybridisation
4. Polymerase chain reaction

38.
Which of the following characteristics is not shared by birds and mammals?
1. Breathing using lungs
2. Viviparity
3. Warm blooded nature
4. Ossified endoskeleton

39.
Select the incorrect statement
1. LH and FSH triggers ovulation in ovary
2. LH and FSH decrease gradually during the follicular phase
3. LH triggers secretion of androgens from the Leydig cells.
4. FSH stimulates the sertoli cells which help in spermiogenesis

40.
The amino acid, tryptophan is the precursor for the synthesis of
1. thyroxine and tri-iodothyronine
2. estrogen and progesterone
3. cortisol and cortisone
4. melatonin and serotonin

41.
Joint Forest Management Concept was introduced in India during
1. 1970s
2. 1980s
3. 1990s
4. 1960s

42.
One of the major compound of cell wall of most fungi is
1. peptidoglycan
2. cellulose
3. hemicelluloses
4. chitin

43.
A complex of ribosomes attached to a single strand of RNA is known as
1. polymer
2. polypeptide
3. okazaki fragment
4. polysome

44.
Which of the following features is not present in the phylum –Arthorpoda?
1. Metameric segmentation
2. Parapodia
3. Jointed appendages
4. Chitinous exoskeleton

45.
Asthma may be attributed to
1. allergic reaction of the mast cells in the lungs
2. inflammation of the trachea
3. accumulation of fluid in the lungs
4. bacterial infection of the lungs

46.
Pick out the correct statements.
I. Haemophilia is a sex-linked recessive disease.
II. Down's syndrome is due to aneuploidy.
III. Phenylketonuria is an autosomal recessive gene disorder.
IV. Sickle cell anaemia is an X-linked recessive gene disorder
1. II and IV are correct
2. I, III and IV are correct
3. I, II and III are correct
4. I and IV are correct

47.
The two polypeptides of human insulin are linked together by
1. phosphodiester bonds
2. covalent bonds
3. disulphide bridges
4. hydrogen bonds

48.
The coconut water from tender coconut represents
1. fleshy mesocarp
2. free – nuclear proembryo
3. free- nuclear endosperm
4. endocarp

49.
Which of the following is not a feature of the plasmids ?
1. Circular structure
2. Transferable
3. Single-stranded
4. Independent replication

50.
Which of the National Aquatic Animal of India?
1. River dolphin
2. Blue whale
3. Sea-horse
4. Gangetic shark

51.
The Avena curvature is used for bioassay of
1. GA_3
2. IAA
3. Ethylene
4. ABA

52.
Which of the following is the most important cause of animals and plants being driven to extinction ?
1. Alien species invasion
2. Habitat loss and fragmentation
3. Co-extinctions
4. Over-exploitation

53.

Which of the following approaches does not give the defined action of contraceptive?

(a)	Intra uterine devices	Increase phagocytosis of sperms, suppress sperm motility and fertilizing capacity of sperms
(b)	Hormonal	Prevent/retard entry of sperms, prevent ovulation and fertilization
(c)	Vasectomy	Prevents spermatogenesis
(d)	Barrier methods	Prevent fertilisation

1. a
2. b
3. c
4. d

54.
In a test cross involving F1 dihybrid flies, more parental-type offspring were produced than the recombinant type offspring. This indicates
1. chromosomes failed to separate during meiosis
2. the two genes are linked and present on the same chromosome
3. both of the characters are controlled by more than one gene
4. the two genes are located on two different chromosomes

55.
A typical fat molecule is made up of
1. One glycerol and three fatty acid molecules
2. One glycerol and one fatty acid molecule
3. Three glycerol and three fatty acid molecules
4. Three glycerol molecules and one fatty acid molecule.

56.
Match the terms in Column I with their description in Column II and choose the correct option.

Column I	Column II
A. Dominance	1. Many govern a single character
B. Codominance	2. In a heterozygous organism only one allele expresses itself
C. Pleiotropy	3. In a heterozygous organism both alleles express themselves fully
D. Polygenic inheritance	4. A single gene influences many characters

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

57.
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 compound 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.

58.
Which of the following features is not present in Periplaneta Americana?
1. Indeterminate and radial cleavage during embryonic development
2. Exoskeleton composed of N-acetylglucosamine
3. Metamerically segmented body
4. Schizocoelom as body cavity

59.
Water soluble pigments found in plant cell vacuoles are
1. cholrophylls
2. carotenoids
3. anthocyanins
4. xanthophylls

60.
A cell at telophase stage is observed by a student in a brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other dividing cells. This would result in
1. polyploidy
2. somaclonal variation
3. polyteny
4. aneuploidy

61.
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

62.
In higher vertebrates, the immune system can distinguish self-cells and non-self. If this property is lost due to genetic abnormality and it attacks self –cells, then it leads to
1. graft rejection
2. auto – immunity disease
3. active immunity
4. allergic response

63.
Emerson’s enhancement effect and red drop have been instrumental in the discovery of
1. two photosystems operating simultaneously
2. photophosphorylation and cyclic electron transport
3. oxidative photophorylatio
4. photophosphorylation and non-cyclic electron transport

64.
Select the correct statement.
1. Salvinia, Ginkgo and Pinus all are gymnosperms
2. Sequoia is one of the tallest trees
3. The leave of gymnosperms are not well adapted to extremes of climate
4. Gymnosperms are both homosporous and heterosporous

65.
Which of the following is not a characteristic feature during mitosis cells ?
1 Disappearance of nucleolus
2. Chromosome movement
3. Synapsis
4. Spindle fibres

66.
Blood pressure in the pulmonary artery is
1. more than that in the carotid
2. more than that in the pulmonary vein
3. less than that in the vena cava
4. same as that in the aorta

67.
Which of the following structure is homologous to the wing of a bird?
1. Wing of a moth
2. Hind limb of rabbit
3. Flipper of whale
4. Dorsal fin of a shark

68.
Seed formation without fertilization in flowering plants involves the process of
1. budding
2. somatic hybridization
3. apomixis
4. sporulation

69.
Name the chronic respiratory disorder caused mainly by cigarette smoking
1. asthma
2. respiratory acidosis
3. respiratory alkalosis
4. emphysema

70.
Spindle fibres attach on to
1. kinetochore of the chromosome
2. centromer of the chromosome
3. kinetosome of the chromosome
4. telomere of the chromosome

71.
In context of amniocentesis which of the following statements is incorrect?
1. it is used for prenatal sex determination
2. it can be used for detection of down syndrome
3. it can be used for detection of cleft palate
4. it is usually done when a women is between 14-16 weeks pregnant.

72.
Stems modified into flat green organs performing the functions of leaves are known as
1. phyllodes
2. phylloclades
3. scales
4. cladodes

73.
In chloroplast the highest number if protons are found in
1. lumen of thylakoids
2. inter membrane space
3. antennae complex
4. stroma

74.
Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomemclature?
1. The first word in a biological name represents the genus name and second is specific epithet
2. The names are derived from latin and written in italics.
3. When written by hand, the names are to be underlined.
4. Biological names can be written in any language

75.
In meiosis crossing over is initiated at
1. leptotene
2. zygotene
3. diplotene
4. pachytene

76.
Antivenom injection contains performed antibodies while polio drops that are administered into the body contain
1. harvested antibodies
2. gamma globulin
3. attenuated pathogens
4. activated pathogens

77.
The Taq polymerase enzyme is obtained from
1. Thiobacillus ferroxidans
2. Bacillius subtilis
3. Pseudomonas putida
4. Thermus aquaticus

78.
Which of the following most appropriately describes haemophilia?
1. X-linked recessive gene disorder
2. Chromosomal disorder
3. Dominant gene disorder
4. Recessive gene disorder

79.
The standard petal of a papilionaceous corolla is also called ?
1. pappus
2. vexillum
3. corona
4. carina

80.
Which part of the tobacco plant is infected by Meloidegyne incognitia?
1. Leaf
2. Stem
3. Root
4. Flower

81.
Which of the following statements is wrong for viroids?
1. They are smaller than viruses
2. They causes infections
3. Their RNA is of high molecular weight
4. They lack a protein coat

82.
Which of the following statements is not true for cancer cells in relation to mutations?
1. Mutations destroy telomerase inhibitor
2. Mutations inactive the cell control
3. Mutations inhibit production of telomerase
4. Mutations in proto –oncogenes accelerate the cell cycle

83.
Which type of tissue correctly matched with its location?

Tissue	Location
(a) Areolar tissue	Tendons
(b) Transitional epithelium	Tip of nose
(c) Cuboidal epithelium	Lining of stomach
(d) Smooth muscle	Wall of intestine

1. a
2. b
3. c
4. d

84.
Which of the following pairs of hormones are not antagonistic (having opposite effects) to each other?

(a) Insulin	Glucagon
(b) Aldosterone	Atrial natriuretic factor
(c) Relaxin	Inhibin
(d) Parathormone	Calcitonin

1. a
2. b
3. c
4. d

85.
Specialised epidermal cells surrounding the guard cells are called
1. subsidiary cells
2. bulliform cells
3. lenticels
4. complementary cells

86.
Fertilisation in humans is practically feasible only if
1. the ovum and sperms are transported simultaneously to ampullary - isthmic junction of the fallopian tube
2. the ovum and sperms are transported simultaneously to ampullary-isthmic junction of the cervix
3. the sperms are transported into cervix within 48 hrs of release of ovum in uterus
4. the sperms are transported into vagin a just after the release of ovum in fallopian tube

87.
Which one of the following is the starter codon?
1. UGA
2. UAA
3. UAG
4. AUG

88.
A river with an inflow of domestic sewage rich in organic waste may result in
1. increased population of aquatic food web organisms
2. an increased production of fish due to biodegradable nutrients
3. death of fish due to lack of oxygen
4. drying of the river very soon due to algal bloom

89.
Following are the two statements regarding the origin of life
I. The earliest organisms that appeared on the earth were non-green and presumably anaerobes.
II. The first autotrophic organisms were the chemoautotrophs that never released oxygen.
Of the above statements which one of the following options is correct?
1. II is correct but I is false
2. Both I and II are correct
3. Both I and II are false
4. I is correct but II is false

90.
A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called
1. contour farming
2. strip farming
3. shifting agriculture
4. ley farming

91.
The addition of a catalyst during a chemical reaction alters which of the following quantities?
1. Internal energy
2. Enthalpy
3. Activation energy
4. Entropy

92.
Predict the correct order among the following.
1. lone pair-lone pair > bond pair-bond pair >lone pair-bond pair
2. bond pair-bond pair> lone pair-bond pair>lone pair-lone pair
3. lone pair-bond pair > bond pair-bond pair >lone pair-lone pair
4. lone pair-lone pair> lone pair-bond pair>bond pair-bond pair

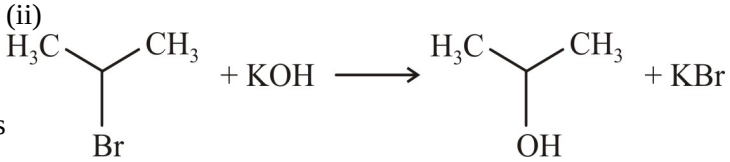
93.
The correct statement regarding the basicity of arylamines is
1. Arylamines are generally more basic than alkylamines because the nitrogen lone-pair electrons are not delocalized by interaction with the aromatic ring π-electron system
2. Arylamines are generally more basic than alkylamines because of aryl group
3. Arylamines are generally more basic than alkylamines, because the nitrogen atom in arylamines is sp-hybridlzed
4. Arylamines are generally less basic than alkylamines because the nitrogen lone-pair electrons are delocalized by interaction with the aromatic ring π-electron system.

94.
When copper is heated with conc. HNO_3 it produces
1. $Cu(NO_3)$ and NO
2. $Cu(NO_3)_2$, NO and NO_2
3. $Cu(NO_3)_2$ and N_2O
4. $Cu(NO_3)_2$ and NO_2

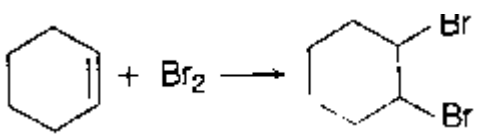
95.
For the following reactions,

(i) $CH_3CH_2CH_2Br + KOH \rightarrow CH_3CH{=}CH_2 + KBr + H_2O$

(ii)



(iii)

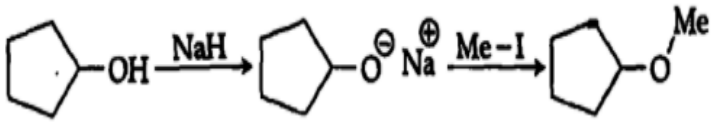


Which of the following statements is correct?
1. (i) is elimination, reaction, (ii) is substitution and (iii) is addition reaction
2. (i) is elimination, (ii) and (iii) are substitution reactions
3. (i) is substitution, (ii) and (iii) are addition reactions
4. (i) and (ii) are elimination reactions and (iii) is addition reaction

96.
Two electrons occupying the same orbital are distinguished by.

1. Magnetic quantum number
2. Azimuthal quantum number
3. Spin quantum number
4. Principal quantum number

97.
The reaction



can be classified as
1. Alcohol formation reaction
2. Dehydration reaction
3. Williamson alcohol synthesis reaction
4. Williamson ether synthesis reaction

98.
The electronic configurations of Eu (Atomic no. 63), Gd (Atomic no. 64) and Tb (Atomic no. 65) are

1. [Xe] $4f^6\ 5d^1\ 6s^2$, [Xe]$4f^7\ 5d^1\ 6s^2$ and [Xe] $4f^9\ 6s^2$
2. [Xe] $4f^6\ 5d^1\ 6s^2$, [Xe] $4f^7 5d^1\ 6s^2$ and [Xe]$4f^8\ 5d^1\ 6s^2$
3. [Xe] $4f^7\ 6s^2$, [Xe]$4f^7\ 5d^1\ 6s^2$ and [Xe] $4f^9\ 6s^2$
4. [Xe] $4f^7\ 6s^2$, (Xe]$4f^8\ 6s^2$ and [Xe]$4f^8\ 5d^1\ 6s^2$

99.
At 100 °C the vapour pressure of a solution of 6.5 g of a solute in 100 g water is 732 mm. If K_b = 0.52, the boiling point of this solution will be

1. 100^0C
2. 102^0C
3. 103^0C
4. 101^0C

100.
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 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 torsional strain.

101.
Which one of the following characteristics is associated with adsorption?
1. ΔG, ΔH and ΔS all are negative
2. ΔG and ΔH are negative but ΔS is positive
3. ΔG and ΔS are negative but ΔH is positive
4. ΔG is negative but ΔH and ΔS are positive

102.
Match the compounds given in Column I with the hybridization and shape given in Column II and mark the correct option.

Column I	**Column II**
A) XeF_6	1) Distorted octahedral
B) XeO_3	2) Square planar
C) $XeOF_4$	3) Pyramidal
D) XeF_4	4) Square pyramidal

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

103.
The correct statement regarding a carbonyl compound with a hydrogen atom on its alpha-carbon, is

1. a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibration.

2. a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as carbonylation.

3. a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as keto-enol tautomerism.

4. a carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol.

104.
In a protein molecule, various amino acids are linked together by
1. β-glycosidic bond
2. peptide bond
3. dative bond
4. α-glycosidic bond

105.

Match items of Column I with the items of Column II and assign the correct code.

Column I	**Column II**
A) Cyanide process	1) Ultra pure Ge
B) Froth floatation Process	2) Dressing of ZnS
C) Electrolytic Reduction	3) Extraction of Al
D) Zone refining	4) Extracting of Au
	5) Purification of Ni

1. A-2 B-3 C-1 D-5

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

3. A-3 B-4 C-5 D-1

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

106.
Which of the following is an analgesic?
1. Penicillin
2. Streptomycin
3. Chloromycetin
4. Novalgin

107.
Which is the correct statement for the given acids?
1. Phosphinic acid is a monoprotic acid while phosphonic acid is a diprotic acid
2. Phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid
3. Both are triprotic acids
4. Both are diprotic acids

108.
The pair of electron in the given carbanion, $CH_3C{\equiv}C^-$, is present in which orbitals?
1. sp^3
2. sp^2
3. sp
4. 2p

109.
Consider the molecules CH_4, NH_3 and H_2O. Which of the given statements is false?
1. The H-0-H bond angle in H_2O is larger than the H-C-H bond angle in CH_4
2. The H-C-H bond angle in CH_4 is larger than the H-N-H bond angle in NH_3
3. The H-C-H bond angle in CH_4, the H-N-H bond angle in NH_3 and the H-0-H bond angle in H_2O are all greater than 90^o
4. The H-O-H bond angle in H_2O is smaller than the H-N-H bond angle in NH_3

110.

Which one of the following statements is correct when SO_2 is passed through acidified $K_2Cr_2O_7$solution?

1. The solution is decolorized.

2. SO_2 is reduced.

3. Green coloured $Cr_2(SO_4)_3$ is formed.

4. The solution turns blue.

111.
The correct thermodynamic conditions for the spontaneous reaction at all temperatures is
1. $\Delta H > O$ and $\Delta S < 0$
2. $\Delta H < O$ and $\Delta S > 0$
3. $\Delta H < O$ and $\Delta S < 0$
4. $\Delta H > 0$ and $\Delta S = 0$

112.
Natural rubber has
1. All trans-configuration
2. Alternate cis - and trans-configuration
3. Random cis - and trans-configuration
4. All cis-configuration

113.
In which of the following options the order of arrangement does not agree with the variation of property indicated against it?
1. B < C < N < O (increasing first ionisation enthalpy)
2. I < Br < F < Cl (increasing electron gain enthalpy)
3. Li < Na < K < Rb (increasing metallic radius)
4. $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ (increasing ionic size)

114.
Which of the following reagents would distinguish cis-cyclopenta-1, 2-diol from the trans-isomer?
1. ozone
2. MnO_2
3. Aluminium isopropoxide
4. Acetone

115.
The product obtained as a result of a reaction of nitrogen with CaC_2 is .
1. CaCN
2. $CaCN_3$
3. Ca_2CN
4. $CaCN_2$

116.
Fog is a colloidal solution of
1. Gas in liquid
2. Solid in gas
3. Gas in gas
4. Liquid in gas

117.
Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules?
1. $Cl_2 > Br_2 > F_2 > l_2$
2. $Br_2 > l_2 > F_2 > Cl_2$
3. $F_2 > Cl_2 > Br_2 > l_2$
4. $l_2 > Br_2 > Cl_2 > F_2$

118.
Equal moles of hydrogen and oxygen gases are placed in container with a pin-hole through which both can escape. What fraction of the oxygen escapes in the time required for one-half of the hydrogen to escape?
1. 1/4
2. 3/8
3. 1/2
4. 1/8

119.
Lithium has a bcc structure. Its density is 530 kg m^{-3} and its atomic mass is 6.94 g mol^{-1} Calculate the edge length of a unit cell of lithium metal.
(N_A= 6.02 X 10^{23} mol^{-1})
1. 352 pm
2. 527 pm
3. 264 pm
4. 154 pm

120.
Which of the following statements about the composition of the vapour over an ideal 1:1 molar mixture of benzene and toluene is correct? Assume that the temperature is constant at 25^0c.
(Given, vapour pressure data at 25 °C, benzene= 12.8 kPa, toluene= 3.85 kPa)
1. The vapour will contain a higher percentage of toluene
2. The vapour will contain equal amounts of benzene and toluene
3. Not enough information is given to make a prediction
4. The vapour will contain a higher percentage of benzene

121.
Which of the following has longest C —O bond length?
(Free C—O bond length in CO is 1.128 $\mathring{A}$)
1. $[Co(CO)_4]^-$
2. $[Fe(CO)_4]^{2-}$
3. $Mn(CO)_6]^+$
4. $Ni(CO)_4$

122.
Among the following the correct order of acidity is
1. $HClO < HClO_2 < HClO_3 < HClO_4$
2. $HClO_2 < HClO < HClO_3 < HClO_4$
3. $HClO_4 < HClO_2 < HClO < HClO_3$
4. $HClO_3 < HClO_4 < HClO_2 < HClO$

123.
In the reaction,

$$H-C\equiv CH \xrightarrow[(ii)\ CH_3CH_2Br]{(i)\ NaNH_2/liq.NH_3} X \xrightarrow[(ii)\ CH_3CH_2Br]{(i)\ NaNH_2/liq.NH_3} Y$$

X and Y are
1. X = 2 –butyne; Y = 3 –hexyne
2. X = 2 – butyne; Y = 2-hexyne
3. X = 1-butyne; Y = 2-hexyne
4. X = 1 – butyne; Y = 3 – hexyne

124.
MY and NY_3, two nearly insoluble salts, have the same K_{sp} values of 6.2 x 10^{-13} at room temperature. Which statement would be true in regard to MY and NY_3 ?
1. The molar solubility of MY in water is less than that of NY_3.
2. The salts MY and NY_3 are more soluble in 0.5 M KY than in pure water
3. The addition of the salt of KY to solution of MY and NY_3 will have no effect on their solubilities
4. The molar solubilities of MY and NY_3 in water are identical.

125.
Consider the nitration of benzene using mixed conc. H_2SO_4 and HNO_3. If a large amount of $KHSO_4$ is added to the mixture, the rate of nitration will be
1. slower
2. unchanged
3. doubled
4. faster

126.
Gelatin, an important raw material for preparation of photographic emulsion is a by product of

1. chicken
2. forest
3. cattle
4. fish

127.
The product formed by the reaction of an aldehyde with a primary amine is
1. Ketone
2. Carboxylic acid
3. Aromatic acid
4. Schiff base

128.
The pressure of H_2 required to make the potential of H_2-electrode zero in pure water at 298 K is
1. 10^{-12}atm
2. 10^{-10}atm
3. 10^{-4}atm
4. 10^{-14}atm

129.
The correct statement regarding RNA and DNA, respectively is
1. The sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose
2. The sugar component in RNA is arabinose and the sugar component in DNA is ribose
3. The sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose
4. The sugar component in RNA is arabinose and the sugar component in DNA is 2’-deoxyribose

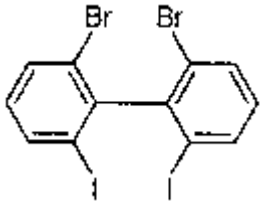
130.
Which one given below is a non-reducing sugar?
1. Lactose
2. Glucose
3. Sucrose
4. Maltose

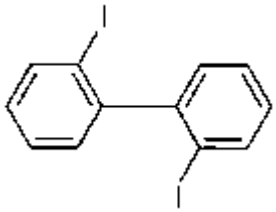
131.
Which of the following statements about hydrogen is incorrect?
1. Hydrogen never acts as cation in ionic salts
2. Hydronium ion, H_3O^+ exists freely in solution
3. Dihydrogen does not act as a reducing agent
4. Hydrogen has three isotopes of which protium is the most common

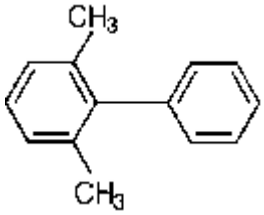
132.
Consider the following liquid-vapour equilibrium
Liquid ↔ Vapour
Which of the following relation is correct?
1. $\frac{dlnp}{dT} = \frac{-\Delta H_v}{RT}$
2. $\frac{dlnp}{dT^2} = \frac{-\Delta H_v}{T^2}$
3. $\frac{dlnp}{dT} = \frac{-\Delta H_v}{RT^2}$
4. $\frac{dlnG}{dT^2} = \frac{-\Delta H_v}{RT^2}$

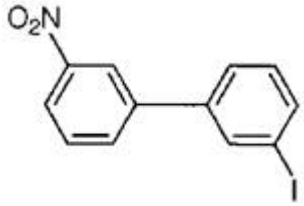
133.

Which of the following biphenyls is optically active?

1. 

2. 

3. 

4. 

134.

Which of the following statements is false?

1. Ca^{2+} ions are important in blood clotting

2. Ca^{2+} ions are not important in maintaining the regular beating of the heart

3. Mg^{2+} ions are important in the green parts of plants

4. Mg^{2+} ions form a complex with ATP

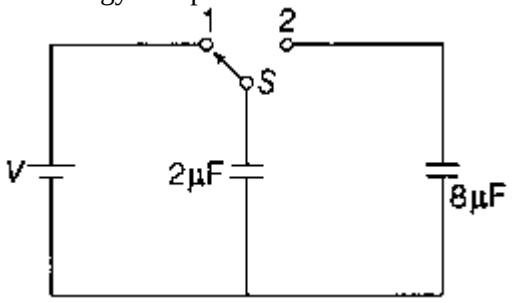
135.

The ionic radii of A+ and B- ions are 0.98 $x10^{-10}$ m and 1.81 $x10^{-10}$ m. The coordination number of each ion in AB is:

1. 8
2. 2
3. 6
4. 4

136.

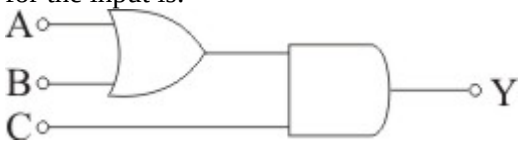
A capacitor of 2 μF is charged as shown in the figure. When the Switch S is turned to position 2, the percentage of its stored energy dissipated is-



1. 20%
2. 75%
3. 80%
4. 0%

137.

To get output 1 for the following circuit, the correct choice for the input is:



1. A = 1, B = 0, C = 0
2. A = 1, B = 1, C = 0
3. A = 1, B = 0, C = 1
4. A = 0, B = 1, C = 0

138.

A potentiometer wire is 100 cm long and a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obtained at 50 cm and 10 cm from the positive end of the wire in the two cases. The ratio of emf of two cells is-

1. 5 : 4
2. 3 : 4
3. 3 : 2
4. 5 : 1

139.

When a metallic surface is illuminated with radiation of wavelength λ, the stopping potential is V. If the same surface is illuminated with radiation of wavelength 2λ, the stopping potential is $\frac{V}{4}$. The threshold wavelength for the metallic surface is

1. 5λ
2. $\frac{5}{2}\lambda$
3. 3λ
4. 4λ

140.
Two non-mixing liquids of densities ρ and nρ (n > 1) are put in a container. The height of each liquid is h. A solid cylinder of length L and density d is put in this container. The cylinder floats with its axis vertical and length rL (r < 1) in the denser liquid. The density d is equal to:

1. [2 + (n + 1)r]ρ
2. [2 + (n − 1)r]ρ
3. [1 + (n − 1)r]ρ
4. [1 + (n + 1)r]ρ

141.
Out of the following options which one can be used to produce a propagating electromagnetic wave?

1. A stationary charge
2. A charge-less particle
3. An accelerating charge
4. A charge moving at constant velocity

142.
The charge following through a resistance R varies with time t as $Q = at - bt^2$, where a and b are positive constants. The total heat produced in R is:

1. $\frac{a^3R}{3b}$
2. $\frac{a^3R}{2b}$
3. $\frac{a^3R}{b}$
4. $\frac{a^3R}{6b}$

143.
At what height from the surface of the earth, the gravitation potential and the value of g are: 5.4×10^7 Jkg^{-2} and 6.0 ms^{-2} respectively? (Take, the radius of earth as 6400 km)

1. 1600 Km
2. 1400 km
3. 2000 km
4. 2600 km

144.
The coefficient of linear expansion of brass and steel rods are α_1 and α_2. Lengths of brass and steel rods are l_1 and l_2 respectively. If (l_2-l_1) remains the same at all temperatures, which one of the following relations holds good?

1. $\alpha_1 I_2^2 = \alpha_2 I_1^2$
2. $\alpha_1^2 I_2 = \alpha_2^2$
3. $\alpha_1 I_1 = \alpha_2 I_2$
4. $\alpha_1 I_2 = \alpha_2 I_1$

145.
The intensity at the maximum in a Young's double-slit experiment is I_0. Distance between two slits is d = 5λ, where λ is the wavelength of light used in the experiment. What will be the intensity in front of one of the slits on the screen placed at a distance D = 10 d?

1. $\frac{I_0}{4}$
2. $\frac{3}{4}I_0$
3. $\frac{I_0}{2}$
4. I_0

146.
Given, the value of Rydberg constant is 10^7 m^{-1}, the wave number of the last line of the Balmer series in hydrogen spectrum will be:

1. 0.5×10^7 m^{-1}
2. 0.25×10^7 m^{-1}
3. 2.5×10^7 m^{-1}
4. 0.025×10^4 m^{-1}

147.
The ratio of escape velocity at earth (v_e) to the escape velocity at a planet (v_p) whose radius and mean density are twice that of the earth is:

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

148.
A long solenoid has 1000 turns. When a current of 4A flows through it, the magnetic flux linked with each turn of the solenoid is 4×10^{-3} Wb. The self-inductance of the solenoid is:

1. 3H
2. 2H
3. 1H
4. 4H

149.
A car is negotiating a curved road of radius R. The road is banked at angle θ. The coefficient of friction between the tyre of the car and the road is μ_s. The maximum safe velocity on this road is.

1. $\sqrt{gR(\frac{\mu_s+\tan\theta}{1-\mu_s\tan\theta})}$
2. $\sqrt{\frac{g}{R}(\frac{\mu_s+\tan\theta}{1-\mu_s\tan\theta})}$
3. $\sqrt{\frac{g}{R^2}(\frac{\mu_s+\tan\theta}{1-\mu_s\tan\theta})}$
4. $\sqrt{gR^2(\frac{\mu_s+\tan\theta}{1-\mu_s\tan\theta})}$

150.
The magnetic susceptibility is negative for
1. Paramagnetic material only
2. Ferromagnetic material only
3. Paramagnetic and ferromagnetic materials
4. Diamagnetic material only

151.
A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of 15 ms^{-1}. Then, the frequency of sound that the observer hears in the echo reflected from the cliff is:(Take, the velocity of sound in air = 330 ms^{-1})

1. 800 Hz
2. 838 Hz
3. 885 Hz
4. 765Hz

152.
A body of mass 1 kg begins to move under the action of a time-dependent force $\vec{F} = (2t\hat{i} + 3t^2\hat{j})$ N, where $\hat{i}$ and $\hat{j}$ are unit vectors along the X and Y-axis. What power will be developed by the force at the time (t)?

1. $(2t^2 + 4t^4)$ W
2. $(2t^3 + 3t^3)$ W
3. $(2t^3 + 3t^5)$ W
4. $(2t^3 + 3t^4)$ W

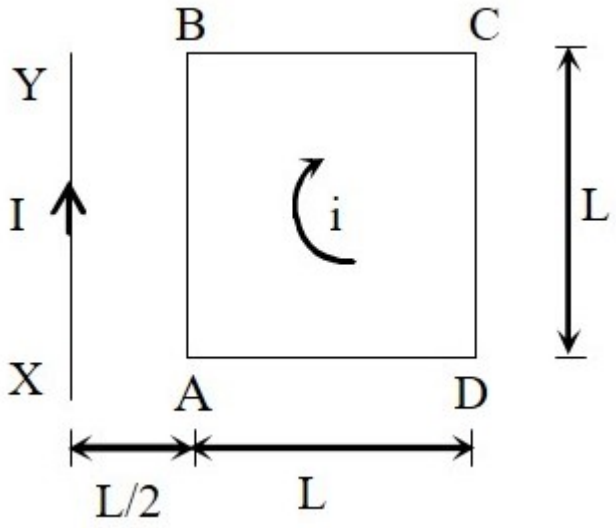
153.
From a disc of radius R and mass M, a circular hole of diameter R, whose rim passes through the centre is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis, passing through the centre?

1. 13 $MR^2/32$
2. 11 $MR^2/32$
3. 9 MR^2 / 32
4. 15 MR^2 / 32

154.
In a diffraction pattern due to a single slit of width a, the first minimum is observed at an angle 30^0 when light of wavelength 5000 $\overset{0}{A}$ is incident on the slit. The first secondary maximum is observed at an angle of

1. $\sin^{-1}(\frac{2}{3})$
2. $\sin^{-1}(\frac{1}{2})$
3. $\sin^{-1}(\frac{3}{4})$
4. $\sin^{-1}(\frac{1}{4})$

155.
A square loop ABCD carrying a current i is placed near and coplanar with a long straight conductor XY carrying a current I, the net force on the loop will be:



1. $\frac{\mu_0 Ii}{2\pi}$
2. $\frac{2\mu_0 IiL}{3\pi}$
3. $\frac{\mu_0 IiL}{2\pi}$

156.
A black body is at a temperature of 5760 K. The energy of radiation emitted by the body at wavelength 250 nm is U_1, at wavelength 500 nm is U_2 and that at 1000 nm is U_3. Wien's constant, b = 2.88 X 10^6 nm-K. Which of the following is correct?

1. $U_3 = 0$
2. $U_1 > U_2$
3. $U_2 > U_1$
4. $U_1 = 0$

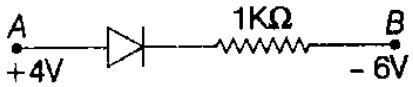
157.
An air column, closed at one end and open at the other, resonates with a tuning fork when the smallest length of the column is 50 cm. The next larger length of the column resonating with the same tuning fork is:

1. 100 cm
2. 150 cm
3. 200 cm
4. 66.7cm

158.
The molecules of a given mass of gas have r.m.s. velocity of 200 ms^{-1} at 27 °C and 1.0x10^5 Nm^{-2}pressure. When the temperature and the pressure of the gas are respectively, 127 °C and 0.05 x 10^5 Nm^{-2}, the RMS velocity of its molecules in ms^{-1} is

1. $\frac{400}{\sqrt{3}}$
2. $\frac{100\sqrt{2}}{3}$
3. $\frac{100}{3}$
4. $100\sqrt{2}$

159.
Consider the junction diode as an ideal. The value of current flowing through AB is:



1. 10^{-2}A
2. 10^{-1}A
3. 10^{-3}A
4. 0A

160.
If the magnitude of sum of two vectors is equal to the magnitude of difference of the two vectors, the angle between these vectors is

1. 90°
2. 45°
3. 180°
4. 0°

161.
An astronomical telescope has an objective and eyepiece of focal lengths 40 cm and 4 cm respectively. To view an object 200 cm away from the objective, the lenses must be separated by a distance :

1. 46.0 cm
2. 50.0 cm
3. 54.0 cm
4. 37.3 cm

162.
An n-p-n transistor is connected in common emitter configuration in a given amplifier. A load resistance of 800Ω is connected in the collector circuit and the voltage drop across it is 0.8V. If the current amplification factor is 0.96 and the input resistance of the circuits is 192Ω, the voltage gain and the power gain of the amplifier will respectively be:

1. 3.69, 3.84
2. 4, 4
3. 4, 3.69
4. 4, 3.84

163.
A gas is compressed isothermally to half its initial volume. The same gas is compressed separately through an adiabatic process until its volume is again reduced to half. Then,

1. compressing the gas through an adiabatic process will require more work to be done

2. compressing the gas isothermally or adiabatically will require the same amount of work

3. which of the case (whether compression through isothermal or through the adiabatic process) requires more work will depend upon the atomicity of the gas

4. compressing the gas isothermally will require more work to be done

164.
A long straight wire of radius a ' carries a steady current I. The current is uniformly distributed over its cross-section. The ratio of the magnetic fields B and B' at radial distances $\frac{a}{2}$ and 2a respectively, from the axis of the wire, is:

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

165.
Match the corresponding entries of Column 1 with Column 2. [Where m is the magnification produced by the mirror]

Column 1	Column 2
A. m = -2	a. Convex mirror
B. m = -1/2	b. Concave mirror
C. m = +2	c. Real image
D. m =+1/2	d. Virtual image

1. A $\rightarrow$ a and c; B $\rightarrow$ a and d; C $\rightarrow$ a and b; D $\rightarrow$ c and d
2. A $\rightarrow$ a and d; B $\rightarrow$ b and c; C $\rightarrow$ b and d; D $\rightarrow$ b and c
3. A $\rightarrow$ c and d; B $\rightarrow$ b and d; C $\rightarrow$ b and c; D $\rightarrow$ a and d
4. A $\rightarrow$ b and c; B $\rightarrow$ b and c; C $\rightarrow$ b and d; D $\rightarrow$ a and d

166.
If the velocity of a particle is v =At+ Bt^2, where A and B are constants, then the distance travelled by it between 1s and 2s is
1. 3A + 7B
2. $\frac{3}{2}A + \frac{7}{3}B$
3. $\frac{A}{2} + \frac{B}{3}$
4. $\frac{3}{2}A + 4B$

167.
A disc and a sphere of the same radius but different masses roll off on two inclined planes of the same altitude and length. Which one of the two objects gets to the bottom of the plane first?
1. Sphere
2. Both reach at the same time
3. Depends on their masses
4. Disc

168.
Two identical charged spheres suspended from a common point by two massless strings of lengths l, are initially at a distance d (d << l) apart because of their mutual repulsion. The charges begin to leak from both the spheres at a constant rate. As a result, the spheres approach each other with a velocity v. Then, v varies as a function of the distance x between the sphere, as
1. $v \propto x$
2. $v \propto x^{-1/2}$
3. $v \propto x^{-1}$
4. $v \propto x^{1/2}$

169.
A particle moves so that its position vector is given by $\vec{r}$ = cosωt $\hat{x}$ + sinωt $\hat{y}$, where ω is a constant. Which of the following is true?

1. Velocity and acceleration both are parallel to $\vec{r}$.
2. Velocity is perpendicular to $\vec{r}$ and acceleration is directed towards to origin
3. Velocity is parallerl to $\vec{r}$ and acceleration is directed away from the origin
4. Velocity and acceleration both are perpendicular to $\vec{r}$.

170.
A piece of ice falls from a height h so that it melts completely. Only one-quarter of the heat produced is absorbed by the ice. The value of H is:

[Latent heat of ice is 3.4 X 10^5J/kg and g =10N/kg]

1. 544 km
2. 136 km
3. 68 km
4. 34 km

171.
A uniform circular disc of radius 50 cm at rest is free to turn about an axis that is perpendicular to its plane and passes through its centre. It is subjected to a torque that produces a constant angular acceleration of 2.0 rad s^{-2}. Its net acceleration in ms^{-2} at the end of 2.0 s is approximately:
1. 7
2. 6
3. 3
4. 8

172.

What is the minimum velocity with which a body of mass m must enter a vertical loop of radius R so that it can complete the loop?

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

173.

A small-signal voltage $V(t) = V_0 \sin\omega t$ is applied across an ideal capacitor C:

1. over a full cycle the capacitor C does not consume any energy from the voltage source
2. current l(t) is in phase with voltage V(t)
3. current l(t) leads voltage V(t) by 180°
4. current l(t), lags voltage V(t) by 90^o

174.

A uniform rope of length L and mass m_1 hangs vertically from a rigid support. A block of mass m_2 is attached to the free end of the rope. A transverse pulse of wavelength λ_1 is produced at the lower end of the rope. The wavelength of the pulse when it reaches the top of the rope is λ_2 . The ratio $\frac{\lambda_2}{\lambda_1}$ is:

1. $\sqrt{\frac{m_1+m_2}{m_2}}$
2. $\sqrt{\frac{m_2}{m_1}}$
3. $\sqrt{\frac{m_1+m_2}{m_1}}$
4. $\sqrt{\frac{m_1}{m_2}}$

175.

An inductor 20mH, a capacitor 50μF, and a resistor 40Ω are connected in series across a source of emf V = 10sin340t. The power loss in the AC circuit is:

1. 0.67 W
2. 0.76 W
3. 0.89 W
4. 0.51 W

176.

An electron of mass m and a photon have same energy E. The ratio of de-Broglie wavelengths associated with them is (c is the velocity of light) :

1. $(\frac{E}{2m})^{\frac{1}{2}}$
2. $c(2\,mE)^{\frac{1}{2}}$
3. $\frac{1}{c}(\frac{2m}{E})^{\frac{1}{2}}$
4. $\frac{1}{c}(\frac{E}{2m})^{\frac{1}{2}}$

177.

When an α– particle of mass m moving with velocity v bombards on a heavy nucleus of charge Ze, its distance of closest approach from the nucleus depends on m as:

1. $\frac{1}{\sqrt{m}}$
2. $\frac{1}{m^2}$
3. m
4. $\frac{1}{m}$

178.

A refrigerator works between 4^0C and 30^0C. It is required to remove 600 calories of heat every second to keep the temperature of the refrigerated space constant. The power required is:
(Take, 1 cal= 4.2 Joules)

1. 23.65 W
2. 236.5 W
3. 2365 W
4. 2.365 W

179.

A particle of mass 10 g moves along a circle of radius 6.4 cm with a constant tangential acceleration. What is the magnitude of this acceleration, if the kinetic energy of the particle becomes equal to 8×10^{-4}J by the end of the second revolution after the beginning of the motion?

1. 0.15 m/s^2
2. 0.18 m/s^2
3. 0.2 m/s^2
4. 0.1 m/s^2

180.

The angle of incidence for a ray of light at a refracting surface of a prism is 45^0. The angle of prism is 60^0. If the ray suffers minimum deviation through the prism, the angle of minimum deviation and refractive index of the material of the prism respectively, are

1. 45°, $\sqrt{2}$
2. 30°, $\sqrt{2}$
3. 30°, $\frac{1}{\sqrt{2}}$
4. 45°, $\frac{1}{\sqrt{2}}$