ADDA 247

NEET (UG)-2015
Questions With Answers

Time : 3 hrs. **M.M.: 720**

Important Instructions :

1. The test is of 3 hours duration and the Test Booklet contains 180 multiple choice questions (four options with a single correct answer) from Physics(45 Questions), Chemistry (45 Questions) and Biology (90 Questions).
2. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, 1 mark will be deducted from the total scores. The maximum marks are 720.
3. Use Blue / Black Ball point Pen only for writing particulars on this page / marking responses on Answer Sheet.
4. On completion of the test, the candidate must handover the Answer Sheet (ORIGINAL and OFFICE Copy) to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
5. The CODE for this Booklet is 48.

Q1. In is classic experiments on pea plants, Mendel did not use:
(a) Pod length
(b) Seed shape
(c) Flower position
(d) Seed colour

Q2. Which one of the following is not applicable to RNA?
(a) 5' phosphoryl and 3' hydroxyl ends
(b) Heterocyclic nitrogenous bases
(c) Chargaff's rule
(d) Complementary base pairing

Q3. Male gametophyte in angiosperms producers:
(a) Single sperm and a vegetative cell
(b) Single sperm and two vegetative cells
(c) Three sperms
(d) Two sperms and a vegetative cell

Q4. Which of the following are not membrane – bound?
(a) Ribosomes
(b) Lysosomes
(c) Mesosomes
(d) Vacuoles

Q5. The chitinous exoskeleton of arthropods is formed by the polymerization of :
(a) D- glucosamine
(b) N-acetyl glucosamine
(c) Lipoglycans
(d) Keratin sulphate and chondroitin sulphate

Q6. Among China rose, mustard, brinjal, potato, guava, cucumber, onion and tulip, how many plants have superior ovary?
(a) Six
(b) Three
(c) Four
(d) Five

Q7. The function of the gap junction is to:
(a) Facilitate communication between adjoining cells by connecting the cytoplasm for rapid transfer of ions, small molecules and some large molecules.
(b) Separate two cells from each other
(c) Stop substance from leaking across a tissue
(d) Performing cementing to keep neighbouring cell together

Q8. Which of the following immunoglobulins does constitute the largest percentage in human milk?
(a) IgM
(b) IgA
(c) IgG
(d) IgD

Q9. In mammalian eye, the 'fovea' is the centre of the visual field, where:
(a) The optic nerve leaves the eye
(b) Only rods are present

(c) More rods than cones are found
(d) High density of cones occurs, but has no rods

Q10. Doctors use stethoscope to hear the sounds produced during each cardiac cycle. The second sound is heard when:
(a) Ventricular walls vibrate due to gushing in of blood from atria
(b) Semilunar valves close down after the blood flows into vessels from ventricles
(c) AV node receives signal from SA node
(d) AV valves open up

Q11. Coconut water from a tender coconut is:
(a) Free nuclear endosperm
(b) Innermost layers of the seed coat
(c) Degenerated nucellus
(d) Immature embryo

Q12. The cutting of DNA at specific location became possible with the discovery of:
(a) Probes
(b) Selectable markers
(c) Ligases
(d) Restriction enzymes

Q13. Which of the following structure is not found in a prokaryotic cell?
(a) Ribosome
(b) Mesosome
(c) Plasma membrane
(d) Nuclear envelope

Q14. Arrange the following events of meiosis in correct sequence:
(A) Crossing over
(B) Synapsis
(C) Terminalisation of chiasmata
(D) Disappearance of nucleolus
(a) (B), (A), (C), (D)
(b) (A), (B), (C), (D)
(c) (B), (C), (D), (A)
(d) (B), (A), (D), (C)

Q15. A column of water within xylem vessels of tall trees does not break under its weight because of:
(a) Tensile strength of water
(b) Lignification of xylem vessels
(c) Positive root pressure
(d) Dissolved sugars in water

Q16. The imperfect fungi which are decomposers of litter and help in mineral cycling belong to:
(a) Basidiomycetes
(b) Phycomcetes
(c) Ascomycetes
(d) Deuteromycetes

Q17. The structures that help some bacteria to attach to rocks and/or host tissue are :
(a) Fimbriae
(b) Mesosomes

(c) Holdfast
(d) Rhizoids

Q18. The DNA molecule to which the gene of interest is integrated for cloning is called:
(a) Vector
(b) Temple
(c) Carrier
(d) Transformer

Q19. Pick up the wrong statement:
(a) Protista have photosynthetic and heterotrophic modes of nutrition
(b) Some fungi are edible
(c) Nuclear membrane is present in Monera
(d) Cell wall is absent in Animalia

Q20. Metagenesis refers to :
(a) Alternation of generation between asexual and sexual phases of an organism
(b) Occurrence a drastic change in form during post-embryonic development
(c) Presence of a segmented body and parthenogenetic mode of reproduction
(d) Presence of different morphic forms

Q21. Which of the following events is not associated with ovulation in human female?
(a) Full development of Graafian follicle
(b) Release of secondary oocyte
(c) LH surge
(d) Decrease in estradiol

Q22. Which of the following joints would allow no movement?
(a) Cartilaginous joint
(b) Synovial joint
(c) Ball and socket joint
(d) Fibrous joint

Q23. Match the following list of microbes and their importance:

(a) *Sacharomyces* cerevisiae	(i) Production of immunosuppressive agents
(b) *Monascus purpureus*	(ii) Ripening of Swiss cheese
(c) *Trichoderma polysporum*	(iii) Commercial production of ethanol
(d) *Propionibacterium shermanii*	(iv) Production of blood-cholesterol lowering agents

	(a)	(b)	(c)	(d)
(a)	(iv)	(iii)	(ii)	(i)
(b)	(iv)	(ii)	(i)	(iii)
(c)	(iii)	(i)	(iv)	(ii)
(d)	(iii)	(iv)	(i)	(ii)

(a) a
(b) b
(c) c
(d) d

Q24. The UN conference Parties in climate change in the year 2012 was held at:
(a) Doha
(b) Lima
(c) Warsaw
(d) Durban

Q25. If you suspect major deficiency of antibodies in a person, to which of the following would you like for confirmation
evidence?
(a) Serum albumins
(b) Haemocytes
(c) Serum globulins
(d) Fibrinogen in plasma

Q26. Chromatophores take part in:
(a) Growth
(b) Movement
(c) Respiration
(d) Photosynthesis

Q27. Acid rain is caused by increase in the atmospheric concentration of :
(a) $\cdot SO_3$ and SO
(b) CO_2 and CO
(c) O_3 and dust
(d) SO_2 and NO_2

Q28. During ecological succession :
(a) The establishment of a new biotic community is very fast in its primary phase
(b) The numbers and types of animals remain constant
(c) The changes lead to a community that is in near equilibrium with the environment and is called pioneer community
(d) The gradual and predictable change in species composition occurs in a given area

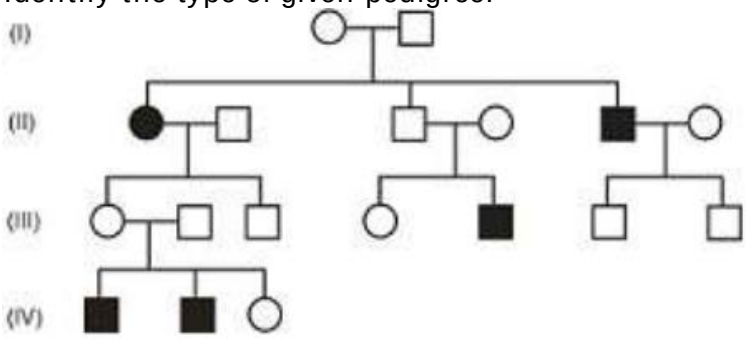
Q29. The oxygen evolved during photosynthesis comes from water molecules. Which one of the following pairs of elements is
involved in this reaction?
(a) Manganese and Potassium
(b) Magnesium and Molybdenum
(c) Magnesium and Chlorine
(d) Manganese and chlorine

Q30. Which of the following pairs is not correctly matched?

	Mode of reproduction	Example
(a)	Rhizome	Banana
(b)	Binary fission	Sargassum
(c)	Conidia	Penicillium
(d)	Offset	Water hyacinth

(a) a
(b) b
(c) c
(d) d

Q31. In the following human pedigree, the filled symbols represent the affected individuals. Identify the type of given pedigree.



(a) X-linked recessive
(b) Autosomal recessive
(c) X-linked dominant
(d) Autosomal dominant

Q32. Which one of the following animals has two separate circulatory pathways?
(a) Lizard
(b) Whale
(c) Shark
(d) Frog

Q33. Flowers are unisexual in
(a) Cucumber
(b) China rose
(c) Onion
(d) Pea

Q34. Which one of the following fruits is parthenocarpic?
(a) Apple
(b) Jackfruit
(c) Banana
(d) Brinjal

Q35. A pleiotropic gene
(a) Is a gene evolved during Pliocene
(b) Controls a trait only in combination with another gene
(c) Controls multiple traits in an individual
(d) Is expressed only primitive plants

Q36. Which of the following is not a function of the skeletal system?
(a) Storage of minerals
(b) Production of body heat
(c) Locomotion
(d) Production of erythrocytes

Q37. A jawless fish, which lays eggs in fresh water and whose ammocoetes larvae after metamorphosis return to the ocean is:
(a) Myxine
(b) Neomyxine
(c) Petromyzon
(d) Eptatretus

Q38. Filiform apparatus is characteristic features of:
(a) Nucellar embryo
(b) Aleurone cell
(c) Synergids
(d) Generative cell

Q39. Read the different components from (A) to (D) in the list given below and tell the correct order of the components with reference to their arrangement from outer side to inner side in a woody dicot stem:
(A) Secondary cortex
(B) Wood
(C) Secondary phloem
(D) Phellem
(a) (A), (B), (D), (C)
(b) (D), (A), (C), (B)
(c) (D), (C), (A), (B)
(d) (C), (D), (B), (A)

Q40. Which one of the following hormones is not involved in sugar metabolism?
(a) Aldosterone
(b) Insulin
(c) Glucagon
(d) Cortisone

Q41. Golden rice is a genetically modified crop plant where the incorporated gene is meant for biosynthesis of:
(a) Vitamin C
(b) Omega 3
(c) Vitamin A
(d) Vitamin B

Q42. Outbreeding is an important strategy of animal husbandry because it:
(a) Is useful in producing purelines of animals
(b) Is useful in overcoming inbreeding depression
(c) Expose harmful recessive genes that are eliminated by selection.
(d) Helps in accumulation of superior genes.

Q43. A gene showing codominance has:
(a) Alleles tightly linked on the same chromosome
(b) Alleles that are recessive to each other
(c) Both alleles independently expressed in the heterozygote
(d) One allele dominant on the other

Q44. Which one of the following hormones though synthesised elsewhere, is stored and release by the master gland?
(a) Luteinizing hormone
(b) Prolactin
(c) Melanocyte stimulating hormone
(d) Antidiuretic hormone

Q45. Increase in concentration of the toxicant at successive trophic levels is known as :
(a) Biodeterioration
(b) Biotransformation
(c) Biogeochemical cycling

(d) Biomagnification

Q46. Industrial melanism is an example of:
(a) Natural selection
(b) Mutation
(c) Neo Lamarckism
(d) Neo Darwinism

Q47. The primary dentition in human differs from permanent dentition in not having one of the following type of teeth:
(a) Premolars
(b) Molars
(c) Incisors
(d) Canine

Q48. The wheat grain has an embryo with one large, shield-shaped cotyledon known as:
(a) Coleorhiza
(b) Scutellum
(c) Coleoptile
(d) Epiblast

Q49. The body cells in cockroach discharges their nitrogenous waste in the Haemolymph mainly in the form of:
(a) Potassium urate
(b) Urea
(c) Calcium carbonate
(d) Ammonia

Q50. Which of the following biomolecules does have a phosphodiester bond?
(a) Monosaccharides in a polysaccharide
(b) Amino acids in a polypeptide
(c) Nucleic acids in a nucleotide
(d) Fatty acids in a diglyceride

Q51. The term ''linkage'' was coined by:
(a) T. Boveri
(b) G. Mendel
(c) W. Sutton
(d) T.H. Morgan

Q52. Which one is a wrong statement?
(a) Mucor has biflagellate zoospores
(b) Haploid endosperm is typical feature of gymnosperms
(c) Brown algae have chlorophyll a and c, and fucoxanthin
(d) Archegonia are found in Bryophyta, Pteridophyta and Gymnosperms

Q53. Ectopic pregnancies are referred to as:
(a) Implantation of embryo at side other than uterus
(b) Implantation of defective embryo in the uterus
(c) Pregnancies terminated due to hormonal imbalance
(d) Pregnancies with genetic abnormality.

Q54. Most animals that live in deep oceanic waters are:
(a) Secondary consumers
(b) Tertiary consumers
(c) Detritivores
(d) Primary consumers

Q55. Which of the following diseases is caused by a protozoan?
(a) Influenza
(b) Babesiosis
(c) Blastomycosis
(d) Syphilis

Q56. In which of the following interaction both partners are adversely affected?
(a) Predation
(b) Parasitism
(c) Mutualism
(d) Competition

Q57. Identify the correct order of organization of genetic material from largest to smallest:
(a) Genome, chromosomes, nucleotide, gene
(b) Genome, chromosome, gene, nucleotide
(c) Chromosome, genome, nucleotide, gene
(d) Chromosome, gene, genome, nucleotide

Q58. A colour blind man marries a women with normal sight who has no history of colour blindness in her family. What is the probability of their grandson being colour blind?
(a) 1
(b) Nil
(c) 0.25
(d) 0.5

Q59. In photosynthesis, the light-independent reactions take place at :
(a) Photosystem I
(b) Photosystem II
(c) Stromal matrix
(d) Thylakoid lumen

Q60. In which of the following both pairs have correct combination?

(a)	Gaseous nutrient cycle	Carbon and Sulphur
	Sedimentary nutrient cycle	Nitrogen and Phosphorus
(b)	Gaseous nutrient cycle	Nitrogen and Sulphur
	Sedimentary nutrient cycle	Carbon and phosphorus
(c)	Gaseous nutrient cycle	Sulphur and Phosphorus
	Sedimentary nutrient cycle	Carbon and Nitrogen
(d)	Gaseous nutrient cycle	Carbon and Nitrogen
	Sedimentary nutrient cycle	Sulphur and phosphorus

(a) a
(b) b
(c) c
(d) d

Q61. The introduction of t-DNA into plants involves:
(a) Altering the pH of the soil, then heat-shocking the plants
(b) Exposing the plants to cold for a brief period
(c) Allowing the plant roots to stand in water
(d) Infection of the plant by Agrobacterium tumefaciens

Q62. The wings of a bird and the wings of an insect are :
(a) Analogous structures and represent convergent evolution
(b) Phylogenetic structures and represent divergent evolution
(c) Homologous structures and represent convergent evolution
(d) Homologous structures and represent divergent evolution

Q63. Root pressure is usually acidic because
(a) Low osmotic potential in soil
(b) Passive absorption
(c) Increase in transpiration
(d) Active absorption

Q64. Human urine is usually acidic because
(a) Excreted plasma proteins are acidic
(b) Potassium and sodium exchange generates acidity
(c) Hydrogen ions are actively secreted into the filtrate
(d) The sodium transporter exchanges one hydrogen ion for each sodium ion, in peritubular capillaries.

Q65. A protoplast is a cell :
(a) Without nucleus
(b) Undergoing division
(c) Without cell wall
(d) Without plasma membrane

Q66. The species confined to a particular region and not found elsewhere termed as :
(a) Alien
(b) Endemic
(c) Rare
(d) Keystone

Q67. Select the wrong statement:
(a) W.M. Stanley showed that viruses could be crystallized
(b) The term 'contagium vivum fluidum' was coined by M.W. Beijerinek
(c) Mosaic disease in tobacco and AIDS in human being are caused by viruses
(d) The viroids were discovered by D.J. Ivanowski

Q68. Axile placentation is present in:
(a) Lemon
(b) Pea
(c) Argemone
(d) Dianthus

Q69. A childless couple can be assisted to have a child through a technique called GIFT. The full form of this techniques is:
(a) Gamete intra fallopian transfer
(b) Gamete internal fertilization and transfer
(c) Germ cell internal fallopian transfer
(d) Gamete inseminated fallopian transfer

Q70. Destruction of the anterior horn cells of the spinal cord would result in loss of :
(a) Voluntary motor impulses
(b) Commissural impulses
(c) Integrating impulses
(d) Sensory impulses

Q71. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by:
(a) Xanthophyll
(b) Carotene
(c) Cytochrome
(d) Leghaemoglobin

Q72. An association of individuals of different species living in the same habitat and having functional interactions is:
(a) Biotic community
(b) Ecosystem
(c) Population
(d) Ecological niche

Q73. Name the pulmonary disease in which alveolar surface area involved in gas exchange is drastically reduced due to damage in the alveolar walls.
(a) Emphysema
(b) Pneumonia
(c) Asthama
(d) Pleurisy

Q74. Balbiani rings are sites of:
(a) Nucleotide synthesis
(b) Polysaccharide synthesis
(c) RNA and protein synthesis
(d) Lipid synthesis

Q75. Match the columns and identify the correct option.

	Column I		Column II
(a)	Thylakoids	(i)	Disc-Shaped sacs in Golgi apparatus
(b)	Cristae	(ii)	Condensed structure of DNA
(c)	Cisternae	(iii)	Flat membranous sacs in stroma
(d)	Chromatin	(iv)	Infoldings in mitochondria

	(a)	(b)	(c)	(d)
(a)	(iii)	(iv)	(i)	(ii)
(b)	(iii)	(i)	(iv)	(ii)
(c)	(iii)	(iv)	(ii)	(i)
(d)	(iv)	(iii)	(i)	(ii)

(a) a
(b) b
(c) c
(d) d

Q76. Cellular organelles with membranes are:
(a) Chromosomes, ribosomes and endoplasmic reticulum
(b) Endoplasmic reticulum, ribosomes and nuclei
(c) Lysosomes, Golgi apparatus and mitochondria
(d) Nuclei, ribosomes and mitochondria

Q77. Auxin can be bioassayed by:
(a) Hydroponics
(b) Potometer
(c) Lettuce hypocotyl elongation
(d) Avena coleoptile curvature

Q78. Which of the following layers in an antral follicle is acellular?
(a) Theca interna
(b) Stroma
(c) Zona pellucida
(d) Granulosa

Q79. Satellite DNA is important because it:
(a) Shows high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is heritable from parents to children.
(b) Does not code for proteins and is same in all members of the population.
(c) Codes for enzymes needed for DNA replication.
(d) Codes for proteins needed in cell cycle.

Q80. Cell wall is absent in:
(a) Funaria
(b) Mycoplasma
(c) Nostoc
(d) Aspergillus

Q81. In angiosperms, microsporogensis and megasporogenesis:
(a) Form gametes without further divisions
(b) Involve meiosis
(c) Occur in ovule
(d) Occur in anther

Q82. Roots play insignificant role in absorption of water in :
(a) Pistia
(b) Pea
(c) Wheat
(d) Sunflower

Q83. Which of the following are most suitable indicators of SO_2 Pollution in the environment?
(a) Conifers
(b) Algae
(c) Fungi
(d) Lichens

Q84. Grafted kidney may be rejected in a patient due to:
(a) Cell-mediated immune response
(b) Passive immune response

(c) Innate immune response
(d) Humoral immune response

Q85. Body having meshwork of cells, internal cavities lined with food filtering flagellated cells and indirect development are the characteristics of phylum:
(a) Porifera
(b) Mollusca
(c) Protozoa
(d) Coelenterata

Q86. In which group of organisms, the cell walls form two thin lapping shells which fit together
(a) Euglenoids
(b) Dinoflagellates
(c) Slime moulds
(d) Chrysophytes

Q87. Choose the wrong statement:
(a) Neurospora is used in the study of biochemical genetics
(b) Morels and truffles are poisonous mushrooms
(c) Yeast is unicellular and useful in fermentation
(d) Penicillium is multicellular and produces antibiotcs

Q88. In human females, meiosis-II is not completed until?
(a) Fertilization
(b) Uterine implantation
(c) Birth
(d) Puberty

Q89. Eutrophication of water bodies leading to killing of fishes is mainly due to non-availability of:
(a) Light
(b) Essential Minerals
(c) Oxygen
(d) Food

Q90. The enzyme that is not present in succus entericus is:
(a) Nucleases
(b) Nucleosidase
(c) Lipase
(d) Maltase

Q91. Reaction of phenol with chloroform in presence of dilute sodium hydroxide finally introduces which one of the following functional groups?
(a) $-CH2Cl$
(b) $-COOH$
(c) $-CHCl_2$
(d) $-CHO$

Q92. If the equilibrium constant for $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ is K, the equilibrium constant for $\frac{1}{2}N_2(g) + \frac{1}{2}O_2g \rightleftharpoons NO(g)$ will be:
(a) $K^{\frac{1}{2}}$

(b) $\frac{1}{2}K$
(c) K
(d) K^2

Q93. 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What will be the percentage purity of magnesium carbonate in the sample?
(Atomic weight: Mg = 24)
(a) 75
(b) 96
(c) 60
(d) 84

Q94. The number of water molecules is maximum in:
(a) 18 molecules of water
(b) 1.8 gram of water
(c) 18 gram of water
(d) 18 moles of water

Q95. The formation of the oxide ion, $O^{2-}(g)$, from oxygen atom requires first an exothermic and then an endothermic step as shown in below:

$O(g) + e^- \longrightarrow O^-(g)$; $\Delta_f H^\ominus = -141\ kJ\ mol^{-1}$

$O^-(g) + e^- \longrightarrow O^{2-}(g)$; $\Delta_f H^\ominus = +780\ kJ\ mol^{-1}$

Thus process of formation of O^{2-} in gas phase is unfavourable though O^{2-} is isoelectronic with neon. It is due to the fact that,
(a) Electron repulsion outweighs the stability gained by achieving noble gas configuration.
(b) O^- ion has comparatively smaller size than oxygen atom.
(c) Oxygen is more electronegative.
(d) Addition of electron in oxygen results in larger size of the ion.

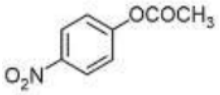
Q96. What is mole fraction of the solute in a 1.00 m aqueous solution?
(a) 0.177
(b) 1.770
(c) 0.0354
(d) 0.0177

Q97. The rate constant of the reaction $A \longrightarrow B$ is $0.6 \times 10{-}3$ mole per second. If the concentration of A is 5M, then concentration of B after 20 minutes is:
(a) 1.08 M
(b) 3.60 M
(c) 0.36 M
(d) 0.72 M

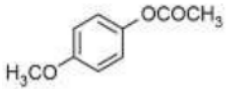
Q98. Decreasing order of stability of O_2, O_2^-, O_2^+ and O_2^{2-} is:
(a) $O_2^+ > O_2 > O_2^- > O_2^{2-}$
(b) $O_2^{2-} > O_2^- > O_2 > O_2^+$
(c) $O_2 > O_2^+ > O_2^{2-} > O_2^-$
(d) $O_2^- > O_2^{2-} > O_2^+ > O_2$

Q99. Which one of the following esters gets hydrolysed most easily under alkaline conditions?

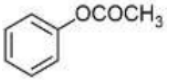
(a)



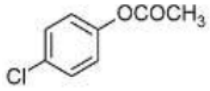
(b)



(c)



(d)



Q100. On heating which of the following releases CO_2 most easily?

(a) K_2CO_3

(b) Na_2CO_3

(c) $MgCO_3$

(d) $CaCO_3$

Q101. Which one of the following pairs of solution is not an acidic buffer?

(a) $HClO_4$ and $NaClO_4$

(b) CH_3COOH and CH_3COONa

(c) H_2CO_3 and Na_2CO_3

(d) H_3PO_4 and Na_3PO_4

Q102. The sum of coordination number and oxidation number of metal M in the complex $[M(en)_2(C_2O_4)]Cl$ (Where en is ethylenediamine) is:

(a) 9

(b) 6

(c) 7

(d) 8

Q103. Which of the statements given below is incorrect?

(a) Cl_2O_7 is an anhydride of perchloric acid

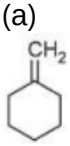
(b) O_3 molecule is bent.

(c) ONF is isoelectronic with O_2N^-

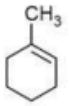
(d) OF_2 is an oxide of fluorine.

Q104. In the reaction with HCl, an alkene reacts in accordance with the Markovnikov's rule, to give a product 1-chloro-1-methylcyclohexane. The possible reaction alkene is:

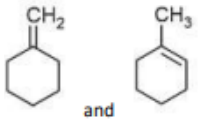
(a)



(b)



(c)



and

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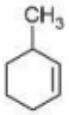
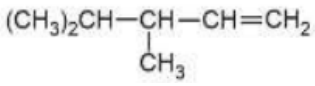


Q105. 2,3-Dimethyl-2-butene can be prepared by heating which of the following compounds with a strong acid?

(a)

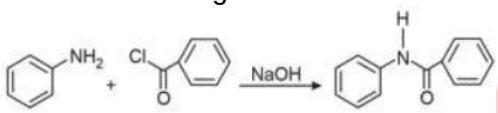


(b) $(CH_3)_3C - CH = CH_2$

(c) $(CH_3)_2C = CH - CH_2 - CH_3$

(d) $(CH_3)_2CH - CH_2 - CH = CH_2$

Q106. The following reaction



Is known by the name:

(a) Friedel-Craft's reaction

(b) Perkin's reaction

(c) Acetylation reaction

(d) Schotten-Baumen reaction

Q107. In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with:

(a) Iron (II) sulphide

(b) Carbon monoxide

(c) Copper (I) sulphide

(d) Sulphur dioxide

Q108. If Avogadro number NA, is changed from $6.022 \times 10^{23}\ mol^{-1}$ to $6.022 \times 10^{20}\ mol^{-1}$, this would change:

(a) The definition of mass in units of grams

(b) The mass of one mole of carbon

(c) The ratio of chemical species to each other in a balanced equation.

(d) The ratio of elements to each other in a compound.

Q109. The variation of the boiling points of the hydrogen halides is in the order HF > HI > HBr > HCl. What explains the higher boiling point of hydrogen fluoride?

(a) The electronegativity of fluorine is much higher than for other elements in the group.

(b) There is strong hydrogen bonding between HF molecules.

(c) The bond energy of HF molecules is greater than in other hydrogen halides.
(d) The effect of nuclear shielding is much reduced in fluorine which polarizes the HF molecule.

Q110. Which of the following reaction(s) can be used for the preparation of alkyl halides?

I. $CH_3CH_2OH + HCl \xrightarrow{Anhyd.ZnCl_2}$
II. $CH_3CH_2OH + HCl \longrightarrow$
III. $(CH_3)_3COH + HCl \longrightarrow$
IV. $(CH_3)_2CHOH + HCl \xrightarrow{Anhyd.ZnCl_2}$

(a) I, III and IV only
(b) I and II only
(c) IV only
(d) III and IV only

Q111. The name of complex ion, $[Fe(CN)_6]^{3-}$ is:
(a) Hexacyanoiron (III) ion
(b) Hexacyanitoferrate (III) ion
(c) Tricyanoferrate (III) ion
(d) Hexacyanidoferrate (III) ion

Q112. Assuming complete ionization, same moles of which of the following compounds will require the least amount of acidified $KMnO_4$ for complete oxidation?
(a) $FeSO_4$
(b) $FeSO_3$
(c) $FeC2O_4$
(d) $Fe(NO_2)_2$

Q113. In which of the following pairs, both the species are not isostructural?
(a) $SiCl_4, PCl_4^+$
(b) Diamond, silicon carbide
(c) NH_3, PH_3
(d) XeF_4, XeO_4

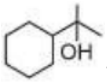
Q114. Caprolactum is used for the manufacture of:
(a) Nylon-6
(b) Teflon
(c) Terylene
(d) Nylon-6,6

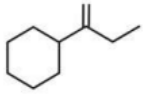
Q115. The hybridization involved in complex [Ni(CN)4
(a) dsp^2
(b) sp^3
(c) d^2sp^2
(d) d^2sp^3

Q116. What is the mass of the precipitate formed when 50 mL of 16.9% solution of $AgNO_3$ is mixed with 50 mL of 5.8% NaCl solution?
(Ag = 107.8, N = 14, O = 16, Na = 23, Cl = 35.5)
(a) 28 g

(b) 3.5 g
(c) 7 g
(d) 14 g

Q117. Gadolinium belongs of 4f series. Its atomic number is 64. Which of the following is the correct electronic configuration of gadolinium?
(a) $[Xe]4f^{8}6d^{2}$
(b) $[Xe]4f^{9}5s^{1}$
(c) $[Xe]4f^{7}5d^{1}6s^{2}$
(d) $[Xe]4f^{6}5d^{2}6s^{2}$

Q118. Which of the following is not the product of dehydration of 

?
(a)

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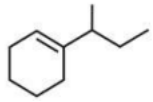
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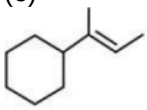
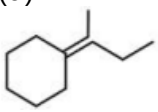

(d)


Q119. A gas such as carbon monoxide would be most likely to obey the ideal gas law at:
(a) High temperatures and low pressures
(b) Low temperatures and high pressures
(c) High temperatures and high pressures
(d) Low temperatures and low pressures

Q120. The stability of +1 oxidation state among Al, Ga, In and Tl increases in the sequence:
(a) Ga < In < Al < Tl
(b) Al < Ga < In < Tl
(c) Tl < In < Ga < A
(d) In < Tl < Ga < Al

Q121. What is the pH of the resulting solution when equal volumes of 0.1 m NaOH and 0.01 M HCl are mixed?
(a) 12.65
(b) 2.0
(c) 7.0
(d) 1.04

Q122. Strong reducing behaviour of H_3PO_2 is due to:
(a) Presence of one –OH group and two p – H bonds
(b) High electron gain enthalpy of phosphorus
(c) High oxidation state of phosphorus
(d) Presence of two –OH groups and one p – H bond

Q123. The number of structural isomers possible from the molecular formula C3H9N is:
(a) 4
(b) 5
(c) 2
(d) 3

Q124. Which of the following statements is not correct for a nucleophile?
(a) Nucleophile is a Lewis acid
(b) Ammonia is a nucleophile
(c) Nucleophiles attack low e^- density sites
(d) Nucleophiles are not electron seeking

Q125. Number of possible isomers for the complex $[Co(en)^2Cl^2]Cl$ will be: (en = ethylene diamine)
(a) 2
(b) 1
(c) 3
(d) 4

Q126. Which is the correct order of increasing energy of the listed orbitals in the atom of titanium?
(At. No. Z = 22)
(a) 3s 4s 3p 3d
(b) 4s 3s 3p 3d
(c) 3s 3p 3d 4s
(d) 3s 3p 4s 3d

Q127. In an SN1 reaction on chiral centres, there is:
(a) 100% racemization
(b) Inversion more than retention leading to partial racemization
(c) 100% retention
(d) 100% inversion

Q128. The vacant space in bcc lattice unit cell is:
(a) 26%
(b) 48%
(c) 23%
(d) 32%

Q129. The heat of combustion of carbon to CO^2 is -393.5 kJ/mol. The heat released upon formation of 35.2 g of CO_2 from carbon and oxygen gas is:
(a) −315 kJ
(b) +315 kJ
(c) −630 kJ
(d) −3.15 kJ

Q130. Aqueous solution of which of the following compounds is the best conductor of electric current?
(a) Acetic acid, $C_2H_4O_2$
(b) Hydrochloric acid, HCl
(c) Ammonia, NH_3
(d) Fructose, $C_6H_{12}O_6$

Q131. The oxidation of benzene by V_2O_5 in the presence of air produces:
(a) Benzoic anhydride
(b) Maleic anhydride
(c) Benzoic acid
(d) Benzaldehyde

Q132. Reaction of a carbonyl compound with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is:
(a) A Grignard reagent
(b) Hydrazine in presence of feebly acidic solution
(c) Hydrocyanic acid
(d) Sodium hydrogen sulphite

Q133. Method by which Aniline cannot be prepared is:
(a) Hydrolysis of phenylisocyanide with acidic solution
(b) Degradation of benzamide with bromine in alkaline solution
(c) Reduction of nitrobenzene with H2/Pd in ethanol.
(d) Potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution.

Q134. Two possible stereo-structures of $CH_3CHOH \cdot COOH$, which are optically active, are called:
(a) Diastereomers
(b) Atropisomers
(c) Enantiomers
(d) Mesomers

Q135. The correct statement regarding defects in crystalline solids is :
(a) Schottky defects have no effect on the density of crystalline solids
(b) Frenkel defects decrease the density of crystalline solids
(c) Frenkel defect is a dislocation defect
(d) Frenkel defect is found in halides of alkaline metals

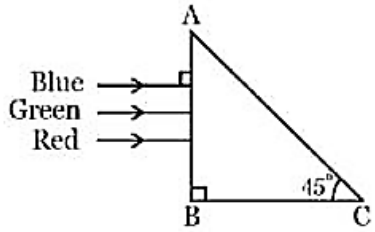
Q136. The position vector of a particle $\vec{R}$ as a function of time is given by:
$\vec{R} = 4\sin(2\pi t)\,\hat{i} + 4\cos(2\pi t)\,\hat{j}$

Where R is in meters, t is in seconds and $\hat{i}$ and $\hat{j}$ denote unit vectors along x- and y-directions, respectively. Which one of the following statements is wrong for the motion of particle?

(a) Magnitude of acceleration vector is $\frac{v^2}{R'}$ where v is the velocity of particle.
(b) Magnitude of the velocity of particle is 8 meter/second
(c) Patch of the particle is a circle of radius 4 meter.
(d) Acceleration vector is along $-\vec{R}$.

Q137. The energy of the electromagnetic waves is of the order of 15 keV. To which part of the spectrum does it belong?
(a) Infra-red rays
(b) Ultraviolet rays
(c) γ-rays
(d) x-rays

Q138. A beam of light consisting of red, green and blue colours is incident on a right-angled prism. The refractive index of the material of the prism for the above red, green and blue wavelengths are 1.39,1.44 and 1.47 respectively.



The prism will:
(a) Separate all the three colours from one another
(b) Not separate the three colours at all
(c) Separate the red colour part from the green and blue colours
(d) Separate the blue colour part from the red and green colours

Q139. Two particles A and B move with constant velocities $\vec{v}_1$ and $\vec{v}_2$. At the initial moment their position vectors $\vec{r}_1$ and $\vec{r}_2$ respectively. The condition for particles A and B for their collision is:

(a) $\vec{r}_1 \cdot \vec{v}_1 = \vec{r}_2 \cdot \vec{v}_2$
(b) $\vec{r}_1 \times \vec{v}_1 = \vec{r}_2 \times \vec{v}_2$
(c) $\vec{r}_1 - \vec{r}_2 = \vec{v}_1 - \vec{v}_2$
(d) $\frac{\vec{r}_1 - \vec{r}_2}{|\vec{r}_1 - \vec{r}_2|} = \frac{\vec{v}_2 - \vec{v}_1}{|\vec{v}_2 - \vec{v}_1|}$

Q140. At the first minimum adjacent to the central maximum of a single-slit diffraction pattern, the phase difference between the Huygens's wavelet from the edge of the slit and the wavelet from the midpoint of the slit is:
(a) $\frac{\pi}{2}$ radian
(b) π radian
(c) $\frac{\pi}{8}$ radian
(d) $\frac{\pi}{4}$ radian

Q141. A proton and an alpha particle both enter a region of uniform magnetic field B, moving at right angles to the field B. if the radius of circular orbits for both the particles is equal and the kinetic energy acquired by proton is 1 MeV, the energy acquired by the alpha particle will be:
(a) 0.5 MeV
(b) 1..5 MeV
(c) 1 MeV
(d) 4 MeV

Q142. A circuit contains an ammeter, a battery of 30 v and a resistance 40.8 ohm all connected in series. If the ammeter has coil of resistance 480 ohm and a shunt of 20 ohm, the reading in the ammeter will be:
(a) 0.25 A
(b) 2 A

(c) 1 A
(d) 0.5 A

Q143. The value of coefficient of volume expansion of glycerine is $5 \times 10^{-4} K^{-1}$. The fractional change in the density of glycerine for a rise of $40°C$ in its temperature is:
(a) 0.020
(b) 0.025
(c) 0.010
(d) 0.015

Q144. An ideal gas is compressed to half its initial volume by means of several processes. Which of the process results in the maximum work done on the gas?
(a) Isobaric
(b) Isochoric
(c) Isothermal
(d) Adiabatic

Q145. A series R-C circuit is connected to an alternating voltage source. Consider two situations:
i. When capacitor is air filled.
ii. When capacitor is mica filled.
Current through resistor is i and voltage across capacitor is V then:
(a) $V_a > V_b$
(b) $i_a > i_b$
(c) $V_a = V_b$
(d) $V_a < V_b$

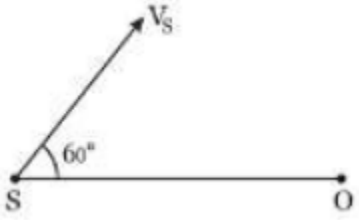
Q146. Light of wavelength 500 nm is incident on a metal with work function 2.258 eV. The de Broglie wavelength of the emitted
electron is:
(a) $< 2.8 \times 10^{-9}$ m
(b) $\geq 2.8 \times 10^{-9}$ m
(c) $\leq 2.8 \times 10^{-12}$ m
(d) $< 2.8 \times 10^{-10}$ m

Q147. Two metal wires of identical dimensions are connected in series. If v_1 and v_2 are the conductivities of the metal wires respectively, the effective conductivity if the combination is:
(a) $\frac{\sigma_1+\sigma_2}{2\,\sigma_1\,\sigma_2}$
(b) $\frac{\sigma_1+\sigma_2}{\sigma_1\,\sigma_2}$
(c) $\frac{\sigma_1\,\sigma_2}{\sigma_1+\sigma_2}$
(d) $\frac{2\,\sigma_1\,\sigma_2}{\sigma_1+\sigma_2}$

Q148. An automobile moves on a road with a speed of 54 km h^{-1}. The radius of its wheels is 0.45 m and the moment of inertia of the wheel about its axis of rotation is 3 kg m^2. If the vehicle is brought to rest in 15s, the magnitude of average torque transmitted by its brakes to the wheel is:
(a) $8.58\ kg\ m^2 s^{-2}$
(b) $10.86\ kg\ m^2 s^{-2}$

(c) $2.86\ kg\ m^2s^{-2}$
(d) $6.66\ kg\ m^2s^{-2}$

Q149. A source of sound S emitting waves of frequency 100 Hz and an observer O are located at some distance from each other.
The source is moving with a speed of 19.4 ms^{-1} at an angle of 60° with the source observer line as shown in the figure.
The observer is at rest. The apparent frequency observed by the observer (velocity of sound in air 330 ms^{-1}), is:

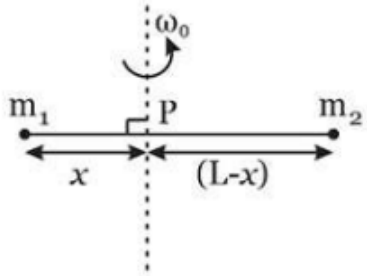


(a) 103 Hz
(b) 106 Hz
(c) 97 Hz
(d) 100 Hz

Q150. On a frictionless surface, a block of mass M moving at speed v collides elastically with another block of same mass M which is initially at rest. After collision the first block moves at an angle θ to its initial direction and has a speed $\frac{v}{3}$. The second block's speed after the collision is:

(a) $\frac{3}{4}v$
(b) $\frac{3}{\sqrt{2}}v$
(c) $\frac{\sqrt{3}}{2}v$
(d) $\frac{2\sqrt{2}}{3}v$

Q151. Point masses m_1 and m_2 are placed at the opposite ends of rigid rod of length L, and negligible mass. The rod is to be set rotating about an axis perpendicular to it. The position of point P on this rod through which the axis should pass so that the work required to set the rod rotating with angular velocity ω_0 is minimum, is given by:



(a) $x = \frac{m_1}{m_2}L$

(b) $x = \frac{m_2}{m_1}L$

(c) $x = \frac{m_2 L}{m_1 + m_2}$

(d) $x = \frac{m_1 L}{m_1 + m_2}$

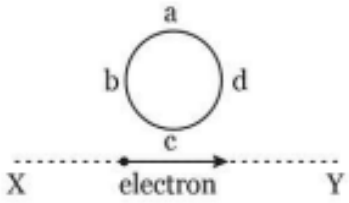
Q152. A ball is thrown vertically downwards from a height of 20 m with an initial velocity v_0. It collides with the ground, loses 50 percent of its energy in collision and rebounds to the same height. The initial velocity v_0 is: (Take $g = 10\ ms^{-2}$)

(a) $20\ ms^{-1}$
(b) $28\ ms^{-1}$
(c) $10\ ms^{-1}$
(d) $14\ ms^{-1}$

Q153. A nucleus of uranium decays at rest into nuclei of thorium and helium. Then:

(a) The helium nucleus has less momentum than the thorium nucleus
(b) The helium nucleus has more momentum than the thorium nucleus
(c) The helium nucleus has less kinetic energy than the thorium nucleus
(d) The helium nucleus has more kinetic energy than the thorium nucleus

Q154. An electron moves on a straight-line path XY as shown. The abcd is a coil adjacent to the path of electron. What will be the direction of current, if any, induced in the coil?



(a) adcb
(b) The current will reverse its direction as the electron goes past the coil
(c) No current induced
(d) abcd

Q155. A particle is executing a simple harmonic motion. Its maximum acceleration is α and maximum velocity is β. Then, its time period of vibration will be:

(a) $\frac{\alpha}{\beta}$
(b) $\frac{\beta^2}{\alpha}$
(c) $\frac{2\pi\beta}{\alpha}$
(d) $\frac{\beta^2}{\alpha^2}$

Q156. Two slits in Young's experiment have widths in the ratio 1 : 25. The ratio of intensity at the maxima and minima in the interference pattern, $\frac{I_{max}}{I_{min}}$ is:

(a) $\frac{121}{49}$
(b) $\frac{49}{121}$
(c) $\frac{4}{9}$

(d) $\frac{9}{4}$

Q157. If potential (in volts) in a region is expressed as $V(x, y, z) = 6xy - y + 2yz$, the electric field (in N/C) at point (1, 1, 0) is:

(a) $-(6\hat{i} + 5\hat{j} + 2\hat{k})$

(b) $-(2\hat{i} + 3\hat{j} + \hat{k})$

(c) $-(6\hat{i} + 9\hat{j} + \hat{k})$

(d) $-(3\hat{i} + 5\hat{j} + 3\hat{k})$

Q158. A parallel plate air capacitor has capacity 'C', distance of separation between plates is 'd' and potential difference 'V' is applied between the plates. Force of attraction between the plates of the parallel plate air capacitor is:

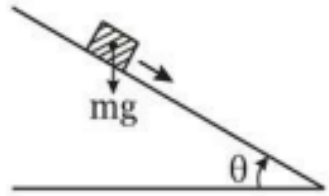
(a) $\frac{CV^2}{2d}$

(b) $\frac{CV^2}{d}$

(c) $\frac{C^2V^2}{2\,d^2}$

(d) $\frac{C^2V^2}{2\,d}$

Q159. A plank with a box on it at one end is gradually raised about the other end. As the angle of inclination with the horizontal reaches 30°, the box starts to slip and slides 4.0 m down the plank in 4.0 s. The coefficients of static and kinetic friction between the box and the plank will be, respectively:



(a) 0.6 and 0.5
(b) 0.5 and 0.6
(c) 0.4 and 0.3
(d) 0.6 and 0.6

Q160. In the spectrum of hydrogen, the ratio of the longest wavelength in the Lyman series to the longest wavelength in the Balmer series is:

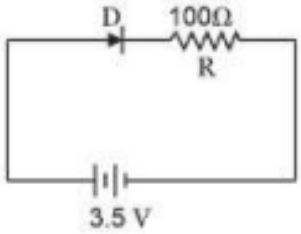
(a) $\frac{9}{4}$

(b) $\frac{27}{5}$

(c) $\frac{5}{27}$

(d) $\frac{4}{9}$

Q161. In the given figure, a diode D is connected to an external resistance R = 100 Ω and an e.m.f. of 3.5 V. If the barrier potential developed across the diode is 0.5 V, the current in the circuit will be:



(a) 40 mA
(b) 20 mA
(c) 35 mA
(d) 30 mA

Q162. A satellite S is moving in an elliptical orbit around the earth. The mass of the satellite is very small compared to the mass of the earth. Then,
(a) The total mechanical energy of S varies periodically with time
(b) The linear momentum of S remains constant is magnitude
(c) The acceleration of S is always directed towards the centre of the earth
(d) The angular momentum of S about the centre of the earth changes in direction, but its magnitude remains constant

Q163. A force $\vec{F} = \alpha\hat{i} + 3\hat{j} + 6\hat{k}$ is acting at a point $\vec{r} = 2\hat{i} - 6\hat{j} - 12\hat{k}$. The value of α for which angular momentum about origin is conserved is:
(a) 2
(b) Zero
(c) 1
(d) -1

Q164. A potentiometer wire of length L and a resistance r are connected in series with a battery of e.m.f. E_0 and a resistance r_1. An unknown e.m.f. E is balanced at a length l of the potentiometer wire. The e.m.f. E will be given by:
(a) $\frac{E_0 r}{(r+r_1)} \cdot \frac{l}{L}$
(b) $\frac{E_0 r}{(r+r_1)} \cdot \frac{l}{L}$
(c) $\frac{LE_0 r}{(r+r_1)l}$
(d) $\frac{LE_0 r}{l\, r_1}$

Q165. 4.0 g of a gas occupies 22.4 litres at NTP. The specific heat capacity of the gas at constant volume is 5.0 $JK^{-1}\ mol^{-1}$. If the speed of sound in this gas at NTP is 952 ms−1, then the heat capacity at constant pressure is (Take gas constant $R = 8.3\ JK^{-1}\ mol^{-1}$)
(a) $7.5\ JK^{-1}\ mol^{-1}$
(b) $7.0\ JK^{-1}\ mol^{-1}$
(c) $8.5\ JK^{-1}\ mol^{-1}$
(d) $8.0\ JK^{-1}\ mol^{-1}$

Q166. Two stones of masses ma and 2 m are whirled in horizontal circles, the heavier one in a radius $\frac{r}{2}$ and the lighter one in radius r. the tangential speed of lighter stone is n times that of the value of heavier stone when they experience same centripetal forces. The value of n is:
(a) 3
(b) 4

(c) 1
(d) 2

Q167. A remote-sensing satellite of earth revolves in a circular orbit at a height of 0.25×10^6 m above the surface of earth. If earth's radius is 6.38×10^6 m and $g = 9.8\ ms^{-2}$, then the orbital speed of the satellite is:
(a) $8.56\ km\ s^{-1}$
(b) $9.13\ km\ s^{-1}$
(c) $6.67\ km\ s^{-1}$
(d) $7.76\ km\ s^{-1}$

Q168. A string is stretched between fixed points separated by 75.0 cm. It is observed to have resonant frequencies of 420 Hz and 315 Hz. There is no other resonant frequency for this string is:
(a) 205 Hz
(b) 10.5 Hz
(c) 105 Hz
(d) 155 Hz

Q169. The coefficient of performance of a refrigerator is 5. If the temperature inside freezer is −20°C, the temperature of the surrounding too which is rejects heat is:
(a) 41°C
(b) 11°C
(c) 21°C
(d) 31°C

Q170. Water rises to a height 'h' in capillary tube. If the length of capillary tube above the surface of water is made less than 'h', then:
(a) Water rises up to the top of capillary tube and stays there without overflowing
(b) Water rises up to a point a little below the top and stays there
(c) Water does not rise at all
(d) Water rises up to the tip of capillary tube and then starts overflowing like a fountain

Q171. Two vessels separately contain two ideal gases A and B at the same temperature, the pressure of a being twice that of B. Under such conditions, the density of A is found to be 1.5 times the density if B. The ratio of molecular weight of A and B is:
(a) $\frac{3}{4}$
(b) 2
(c) $\frac{1}{2}$
(d) $\frac{2}{3}$

Q172. The Young's modulus of steel is twice that of brass. Two wires of same length and of same area of cross section, one of steel and another of brass are suspended from the same roof. If we want the lower ends of the wires to be at the same level, then the weights added to the steel and brass wires must be in the ration of:
(a) 2 : 1
(b) 4 : 1
(c) 1 : 1
(d) 1 : 2

Q173. The input signal given to a CE amplifier having a voltage gain of 150 is $V_i = \cos(15t + \frac{\pi}{3})$ The corresponding output signal will be:

(a) $75\ cos\ \left(15t\ + \frac{2\pi}{3}\right)$

(b) $2\ cos\ \left(15t\ + \frac{5\pi}{6}\right)$

(c) $300\ cos\ \left(15t\ + \frac{4\pi}{3}\right)$

(d) $300\ cos\ \left(15t\ + \frac{\pi}{3}\right)$

Q174. In an astronomical telescope in normal adjustment a straight black line of the length L is drawn on inside part of objective lens. The eye-piece forms a real image of this line. The length of this image is I. The magnification of the telescope is:

(a) $\frac{L}{I} - 1$

(b) $\frac{L+I}{L-I}$

(c) $\frac{L}{I}$

(d) $\frac{L}{I} + 1$

Q175. The heart of a man pumps 5 litres of blood through the arteries per minute at a pressure of 150 mm of mercury. If the density of mercury be 13.6×10^3 kg/m^3 and g = 10 m/s^2 then the power of heart in watt is:

(a) 2.35
(b) 3.0
(c) 1.50
(d) 1.70

Q176. If dimensions of critical velocity v_c of a liquid flowing through a tube are expressed as $[\eta^x \rho^y r^z]$, where η, ρ and r are the coefficient of viscosity of liquid, density of liquid and radius of the tube respectively, then the values of x, y and z are given by:

(a) −1, −1, 1
(b) −1, −1, −1
(c) 1, 1, 1
(d) 1, −1, −1

Q177. A photoelectric surface is illuminated successively by monochromatic light of wavelength λ and $\frac{\lambda}{2}$. If the maximum kinetic energy of the emitted photoelectrons in the second case is 3 times that in the first case, the work function of the surface of the material is:
(h = Planck's constant, c= speed of light)

(a) $\frac{hc}{\lambda}$

(b) $\frac{2hc}{\lambda}$

(c) $\frac{hc}{3\lambda}$

(d) $\frac{hc}{2\lambda}$

Q178. The cylindrical tube of a spray pump has radius R, one end of which has n fine holes, each of radius r. If the speed of the liquid in the tube is V, the speed of the ejection of the liquid through the holes is:

(a) $\frac{VR^2}{nr^2}$

(b) $\frac{VR^2}{n^3r^2}$

(c) $\frac{V^2R}{nr}$

(d) $\frac{VR^2}{n^2r^2}$

Q179. If vectors $\vec{A} = \cos \omega t\, \hat{i} + \sin \omega t\, \hat{j}$ and $\vec{B} = \cos\frac{\omega t}{2}\hat{i} + \sin\frac{\omega t}{2}\hat{j}$ are functions of times, then the value of t at which they are orthogonal to each other is:

(a) $t = \frac{\pi}{2\omega}$

(b) $t = \frac{\pi}{\omega}$

(c) $t = 0$

(d) $t = \frac{\pi}{4\omega}$

Q180. A rectangular coil of length 0.12 m and width 0.1 m having 50 turns of wire is suspended vertically in a uniform magnetic field of strength $0.2\ \text{Weber/m}^2$. The coil carries a current of 2A. if the plane of the coil is inclined at an angle of 30° with the direction of the field, the torque required to keep coil in stable equilibrium will be:

(a) 0.20 Nm

(b) 0.24 Nm

(c) 0.12 Nm

(d) 0.15 Nm