



NEET - 2015

Time: 3 Hours

Total Marks: 720

General Instructions:

1. The test is of **3 hours** duration.
2. The Test Paper contains **180** questions. There are **three** parts in the question paper consisting of **Physics and Chemistry** having **45** questions each and **Biology** with **90** questions.
3. 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**.
4. Out of the four options given for each question, only one option is the correct answer. If more than one response is marked in any question, it will be treated as wrong response and marked up for wrong response will be deducted.
5. No deduction from the total score will be made if no response is indicated for an item in the answer box.
6. Use of Electronic/Manual Calculator is prohibited.



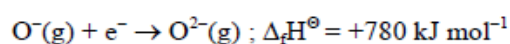
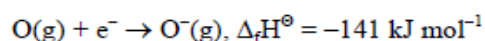
Q.1 2,3-Dimethyl-2-butene can be prepared by heating which of the following compounds with a strong acid?

- (1) $(\text{CH}_3)_2\text{C}=\text{CH}-\text{CH}_2-\text{CH}_3$
(2) $(\text{CH}_3)_2\text{CH}-\text{CH}_2-\text{CH}=\text{CH}_2$
(3) $(\text{CH}_3)_2\text{CH}-\underset{\text{CH}_3}{\text{C}}-\text{CH}=\text{CH}_2$
(4) $(\text{CH}_3)_3\text{C}-\text{CH}=\text{CH}_2$

Q.2 Gadolinium belongs to 4f series. Its atomic number is 64. Which of the following is the **correct** electronic configuration of gadolinium?

- (1) $[\text{Xe}] 4f^7 5d^1 6s^2$ (2) $[\text{Xe}] 4f^6 5d^2 6s^2$
(3) $[\text{Xe}] 4f^8 6d^2$ (4) $[\text{Xe}] 4f^9 5s^1$

Q.3 The formation of the oxide ion, $\text{O}^{2-}(\text{g})$, from oxygen atom requires first an exothermic and then an endothermic step as shown below :



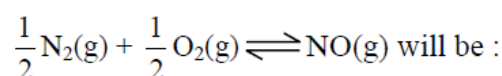
Thus process of formation of O^{2-} in gas phase is unfavourable even though O^{2-} is isoelectronic with neon. It is due to the fact that :

- (1) oxygen is more electronegative
(2) addition of electron in oxygen results in larger size of the ion
(3) electron repulsion outweighs the stability gained by achieving noble gas configuration
(4) O^- ion has comparatively smaller size than oxygen atom

Q.4 The number of structural isomers possible from the molecular formula $\text{C}_3\text{H}_9\text{N}$ is :

- (1) 2 (2) 3 (3) 4 (4) 5

Q.5 If the equilibrium constant for $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$ is K, the equilibrium constant for



- (1) K (2) K^2 (3) $\text{K}^{1/2}$ (4) $\frac{1}{2}\text{K}$

Q.6 Which one of the following pairs of solution is **not** an acidic buffer?

- (1) H_2CO_3 and Na_2CO_3
(2) H_3PO_4 and Na_3PO_4
(3) HClO_4 and NaClO_4
(4) CH_3COOH and CH_3COONa

Q.7 Aqueous solution of which of the following compounds is the best conductor of electric current ?

- (1) Ammonia, NH_3
(2) Fructose, $\text{C}_6\text{H}_{12}\text{O}_6$
(3) Acetic acid, $\text{C}_2\text{H}_4\text{O}_2$
(4) Hydrochloric acid, HCl

Q.8 Caprolactam is used for the manufacture of:

- (1) Terylene (2) Nylon-6, 6
(3) Nylon - 6 (4) Teflon



Q.9 On heating which of the following releases CO_2 most easily ?

- (1) MgCO_3 (2) CaCO_3
(3) K_2CO_3 (4) Na_2CO_3

Q.10 Strong reducing behaviour of H_3PO_2 is due to :

- (1) High oxidation state of phosphorus
(2) Presence of two $-\text{OH}$ groups and one P-H bond
(3) Presence of one $-\text{OH}$ group and two P-H bonds
(4) High electron gain enthalpy of phosphorus

Q.11 Decreasing order of stability of O_2 , O_2^- , O_2^+ and O_2^{2-} is :

- (1) $\text{O}_2 > \text{O}_2^+ > \text{O}_2^{2-} > \text{O}_2^-$
(2) $\text{O}_2^- > \text{O}_2^{2-} > \text{O}_2^+ > \text{O}_2$
(3) $\text{O}_2^+ > \text{O}_2 > \text{O}_2^- > \text{O}_2^{2-}$
(4) $\text{O}_2^{2-} > \text{O}_2^- > \text{O}_2 > \text{O}_2^+$

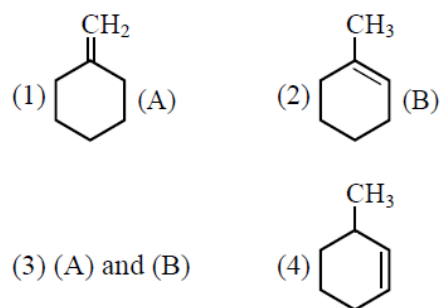
Q.12 The number of water molecules is maximum in :

- (1) 18 gram of water
(2) 18 moles of water
(3) 18 molecules of water
(4) 1.8 gram of water

Q.13 In which of the following pairs, both the species are not isostructural?

- (1) NH_3 , PH_3
(2) XeF_4 , XeO_4
(3) SiCl_4 , PCl_4^+
(4) diamond, silicon carbide

Q.14 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 alkene is :



Q.15 Assuming complete ionization, same moles of which of the following compounds will require the least amount of acidified KMnO_4 for complete oxidation?

- (1) FeC_2O_4 (2) $\text{Fe}(\text{NO}_2)_2$
(3) FeSO_4 (4) FeSO_3

Q.16 Reaction of phenol with chloroform in presence of dilute sodium hydroxide finally introduces which one of the following functional group ?

- (1) $-\text{CHCl}_2$ (2) $-\text{CHO}$
(3) $-\text{CH}_2\text{Cl}$ (4) $-\text{COOH}$



- Q.17** The vacant space in bcc lattice unit cell is :
- (1) 23% (2) 32% (3) 26% (4) 48%
- Q.18** Which of the statements given below is **incorrect** ?
- (1) ONF is isoelectronic with O_2N^-
- (2) OF_2 is an oxide of fluorine
- (3) Cl_2O_7 is an anhydride of perchloric acid
- (4) O_3 molecule is bent
- Q.19** The name of complex ion, $[Fe(CN)_6]^{3-}$ is :
- (1) Tricyanoferrate (III) ion
- (2) Hexacyanidoferrate (III) ion
- (3) Hexacyanoiron (III) ion
- (4) Hexacyanitoferrate (III) ion
- Q.20** If Avogadro number N_A , is changed from $6.022 \times 10^{23} \text{ mol}^{-1}$ to $6.022 \times 10^{20} \text{ mol}^{-1}$, this would change :
- (1) the ratio of chemical species to each other in a balanced equation
- (2) the ratio of elements to each other in a compound
- (3) the definition of mass in units of grams
- (4) the mass of one mole of carbon
- Q.21** Which of the following statements is **not** correct for a nucleophile?
- (1) Nucleophiles attack low e^- density sites
- (2) Nucleophiles are not electron seeking
- (3) Nucleophile is a Lewis acid
- (4) Ammonia is a nucleophile
- Q.22** A gas such as carbon monoxide would be most likely to obey the ideal gas law at :
- (1) high temperatures and high pressures
- (2) low temperatures and low pressures
- (3) high temperatures and low pressures
- (4) low temperatures and high pressures
- Q.23** Hybridization involved in complex the $[Ni(CN)_4]^{2-}$ is : (At. No. Ni = 28)
- (1) d^2sp^2 (2) d^2sp^3
- (3) dsp^2 (4) sp^3
- Q.24** The heat of combustion of carbon to CO_2 is -393.5 kJ/mol . The heat released upon formation of 35.2g of CO_2 from carbon and oxygen gas is -
- (1) -630 kJ (2) -3.15 kJ
- (3) -315 kJ (4) $+315 \text{ kJ}$
- Q.25** 20.0 g of 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 ?
- (1) 60 (2) 84
- (3) 75 (4) 96



Q.26 What is the mole fraction of the solute in a 1.00 m aqueous solution ?

- (1) 0.0354 (2) 0.0177
(3) 0.177 (4) 1.770

Q.27 The correct statement regarding defects in crystalline solids is

- (1) Frenkel defect is a dislocation defect
(2) Frenkel defect is found in the halides of alkaline metals
(3) Schottky defects have no effect on the density of crystalline solids
(4) Frenkel defects decrease the density of crystalline solids

Q.28 The stability of +1 oxidation state among Al, Ga, In and Tl increases in the sequence -

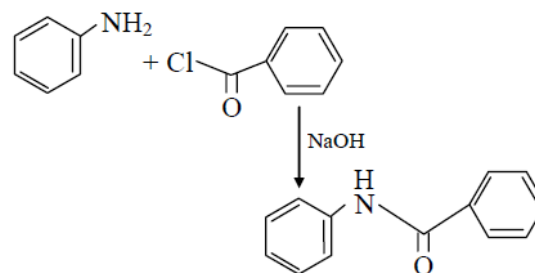
- (1) $Tl < In < Ga < Al$ (2) $In < Tl < Ga < Al$
(3) $Ga < In < Al < Tl$ (4) $Al < Ga < In < Tl$

Q.29 Two possible stereo-structures of

$CH_3CHOH.COOH$, which are optically active, are called :

- (1) Enantiomers (2) Mesomers
(3) Diastereomers (4) Atropisomers

Q.30 The following reaction



is known by the name -

- (1) Acetylation reaction
(2) Schotten-Baumen reaction
(3) Friedel-Craft's reaction
(4) Perkin's reaction

Q.31 The sum of coordination number and oxidation number of the metal M in the complex $[M(en)_2(C_2O_4)]Cl$ (where en is ethylenediamine) is -

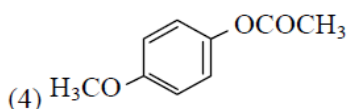
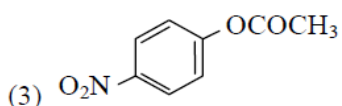
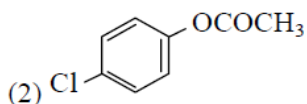
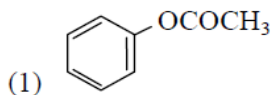
- (1) 7 (2) 8
(3) 9 (4) 6

Q.32 Reaction of a carbonyl compound with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is -

- (1) hydrocyanic acid
(2) sodium hydrogen sulphite
(3) a Grignard reagent
(4) hydrazine in presence of feebly acidic solution



Q.33 Which one of the following esters gets hydrolysed most easily under alkaline conditions -



Q.34 In an S_N1 reaction on chiral centres, there is -

- (1) 100% retention
- (2) 100% inversion
- (3) 100% racemization
- (4) inversion more than retention leading to partial racemization

Q.35 The rate constant of the reaction $A \rightarrow B$ is 0.6×10^{-3} mole per second. If the concentration of A is 5 M, then concentration of B after 20 minutes is -

- (1) 0.36 M
- (2) 0.72 M
- (3) 1.08 M
- (4) 3.60 M

Q.36 What is the pH of the resulting solution when equal volumes of 0.1 M NaOH and 0.01 M HCl are mixed ?

- (1) 7.0
- (2) 1.04
- (3) 12.65
- (4) 2.0

Q.37 Number of possible isomers for the complex $[\text{Co}(\text{en})_2\text{Cl}_2]\text{Cl}$ will be : (en = ethylene diamine)

- (1) 3
- (2) 4
- (3) 2
- (4) 1

Q.38 The variation of the boiling points of the hydrogen halides is in the order $\text{HF} > \text{HI} > \text{HBr} > \text{HCl}$. What explains the higher boiling point of hydrogen fluoride ?

- (1) The bond energy of HF molecules is greater than in other hydrogen halides
- (2) The effect of nuclear shielding is much reduced in fluorine which polarizes the HF molecule
- (3) The electro negativity of fluorine is much higher than for other elements in the group
- (4) there is strong hydrogen bonding between HF molecules

Q.39 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 = 107.3, N = 14, O = 16, Na = 23, Cl = 35.5)

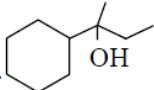
- (1) 7g
- (2) 14g
- (3) 28g
- (4) 3.5 g

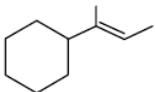
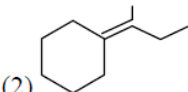
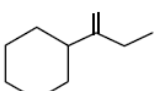
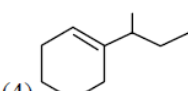


Q.40 The oxidation of benzene by V_2O_5 in the presence of air produces -

- (1) benzoic acid
- (2) benzaldehyde
- (3) benzoic anhydride
- (4) maleic anhydride

Q.41 Which of the following is not the product of

dehydration of  ?

- (1) 
- (2) 
- (3) 
- (4) 

Q.42 Method by which Aniline cannot be prepared is -

- (1) reduction of nitrobenzene with H_2/Pd in ethanol
- (2) potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous $NaOH$ solution
- (3) hydrolysis of phenylisocyanide with acidic solution
- (4) degradation of benzamide with bromine in alkaline solution

Q.43 Which of the following reaction(s) can be used for the preparation of alkyl halides ?

- (I) $CH_3CH_2OH + HCl \xrightarrow{anh. ZnCl_2}$
 - (II) $CH_3CH_2OH + HCl \rightarrow$
 - (III) $(CH_3)_3COH + HCl \rightarrow$
 - (IV) $(CH_3)_2CHOH + HCl \xrightarrow{anh. ZnCl_2}$
- (1) (IV) only
 - (2) (III) and (IV) only
 - (3) (I), (III) and (IV) only
 - (4) (I) and (II) only

Q.44 Which is the correct order of increasing energy of the listed orbitals in the atom of titanium ?

(At. no. $Z = 22$)

- (1) $3s \ 3p \ 3d \ 4s$
- (2) $3s \ 3p \ 4s \ 3d$
- (3) $3s \ 4s \ 3p \ 3d$
- (4) $4s \ 3s \ 3p \ 3d$

Q.45 In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with -

- (1) copper (I) sulphide
- (2) sulphur dioxide
- (3) iron(II) sulphide
- (4) carbon monoxide

Q.46 Root pressure develops due to -

- (1) Increase in transpiration
- (2) Active absorption
- (3) Low osmotic potential in soil
- (4) Passive absorption



- Q.47** Which one is a **wrong** statement?
- (1) Brown algae have chlorophyll a and c, and fucoxanthin
 - (2) Archegonia are found in Bryophyta, Pteridophyta and Gymnosperms
 - (3) *Mucor* has biflagellate zoospores
 - (4) Haploid endosperm is typical feature of gymnosperms

- Q.48** Which of the following structures is **not** found in a prokaryotic cell?
- (1) Plasma membrane
 - (2) Nuclear envelope
 - (3) Ribosome
 - (4) Mesosome

- Q.49** Which one of the following animals has two separate circulatory pathways?
- (1) Shark
 - (2) Frog
 - (3) Lizard
 - (4) Whale

- Q.50** Most animals that live in deep oceanic waters are -
- (1) detritivores
 - (2) primary consumers
 - (3) secondary consumers
 - (4) tertiary consumers

- Q.51** An association of individuals of different species living in the same habitat and having functional interactions is -
- (1) Population
 - (2) Ecological niche
 - (3) Biotic community
 - (4) Ecosystem

- Q.52** The oxygen evolved during photosynthesis comes from water molecules. Which one of the following pairs of elements is involved in this reaction?
- (1) Magnesium and Chlorine
 - (2) Manganese and Chlorine
 - (3) Manganese and Potassium
 - (4) Magnesium and Molybdenum

- Q.53** Axile placentation is present in -
- (1) *Argemone*
 - (2) *Dianthus*
 - (3) Lemon
 - (4) Pea

- Q.54** In which of the following both pairs have **correct** combination?

(1)	Gaseous nutrient cycle	Sulphur and Phosphorus
	Sedimentary nutrient cycle	Carbon and Nitrogen
(2)	Gaseous nutrient cycle	Carbon and Nitrogen
	Sedimentary nutrient cycle	Sulphur and Phosphorus
(3)	Gaseous nutrient cycle	Carbon and Sulphur
	Sedimentary nutrient cycle	Nitrogen and Phosphorus
(4)	Gaseous nutrient cycle	Nitrogen and Sulphur
	Sedimentary nutrient cycle	Carbon and Phosphorus



- Q.55** In mammalian eye, the 'fovea' is the center of the visual field, where -
- (1) more rods than cones are found
 - (2) high density of cones occur, but has no rods
 - (3) the optic nerve leaves the eye
 - (4) only rods are present
- Q.56** Choose the **wrong** statement -
- (1) Yeast is unicellular and useful in fermentation
 - (2) *Penicillium* is multicellular and produces antibiotics
 - (3) *Neurospora* is used in the study of biochemical genetics
 - (4) Morels and truffles are poisonous mushrooms
- Q.57** Which of the following are **not** membrane-bound?
- (1) Mesosomes (2) Vacuoles
 - (3) Ribosomes (4) Lysosomes
- Q.58** In which of the following interactions both partners are adversely affected?
- (1) Mutualism (2) Competition
 - (3) Predation (4) Parasitism
- Q.59** A colour blind man marries a woman with normal sight who has no history of colour blindness in her family. What is the probability of their grandson being colour blind?
- (1) 0.25 (2) 0.5
 - (3) 1 (4) Nil
- Q.60** Ectopic pregnancies are referred to as-
- (1) Pregnancies terminated due to hormonal imbalance
 - (2) pregnancies with genetic abnormality
 - (3) Implantation of embryo at site other than uterus
 - (4) Implantation of defective embryo in the uterus
- Q.61** Cellular organelles with membranes are -
- (1) lysosomes, Golgi apparatus and mitochondria
 - (2) nuclei, ribosomes and mitochondria
 - (3) chromosomes, ribosomes and endoplasmic reticulum
 - (4) endoplasmic reticulum, ribosomes and nuclei



- Q.62** Cell wall is absent in -
(1) *Nostoc* (2) *Aspergillus*
(3) *Funaria* (4) Mycoplasma
- Q.63** The term "linkage" was coined by -
(1) W. Sutton (2) T.H. Morgan
(3) T. Boveri (4) G. Mendel
- Q.64** Which of the following biomolecules does have a phosphodiester bond?
(1) Nucleic acids in a nucleotide
(2) Fatty acids in a diglyceride
(3) Monosaccharides in a polysaccharide
(4) Amino acids in a polypeptide
- Q.65** The primary dentition in human differs from permanent dentition in **not** having one of the following type of teeth -
(1) Incisors (2) Canine
(3) Premolars (4) Molars
- Q.66** A protoplast is a cell -
(1) without cell wall
(2) without plasma membrane
(3) without nucleus
(4) undergoing division
- Q.67** In which group of organisms the cell walls form two thin overlapping shells which fit together?
(1) Slime moulds (2) Chrysophytes
(3) Euglenoids (4) Dinoflagellates
- Q.68** The DNA molecule to which the gene of interest is integrated for cloning is called -
(1) Carrier (2) Transformer
(3) Vector (4) Template
- Q.69** Male gametophyte in angiosperms produces
(1) Three sperms
(2) Two sperms and a vegetative cell
(3) Single sperm and a vegetative cell
(4) Single sperm and two vegetative cell
- Q.70** Coconut water from a tender coconut is -
(1) Degenerated nucellus
(2) Immature embryo
(3) Free nuclear endosperm
(4) Innermost layers of the seed coat
- Q.71** The species confined to a particular region and not found elsewhere is termed as -
(1) Rare (2) Keystone
(3) Alien (4) Endemic



Q.72 Metagenesis refers to -

- (1) Presence of a segmented body and parthenogenetic mode of reproduction
- (2) Presence of different morphic forms
- (3) Alternation of generation between asexual and sexual phases of an organism
- (4) Occurrence of a drastic change in form during post-embryonic development

Q.73 The enzyme that is **not** present in succus entericus is -

- (1) lipase
- (2) maltase
- (3) nucleases
- (4) nucleosidase

Q.74 Eutrophication of water bodies leading to killing of fishes is mainly due to non-availability of -

- (1) oxygen
- (2) food
- (3) light
- (4) essential minerals

Q.75 The function of the gap junction is to -

- (1) stop substance from leaking across a tissue
- (2) performing cementing to keep neighbouring cells together
- (3) facilitate communication between adjoining cells by connecting the cytoplasm for rapid transfer of ions, small molecules and some large molecules.
- (4) separate two cells from each other

Q.76 Match the following list of microbes and their importance -

(1)	<i>Sacharomyces cerevisiae</i>	(i)	Production of immunosuppressive agents
(2)	<i>Monascus purpureus</i>	(ii)	Ripening of Swiss cheese
(3)	<i>Trichoderma polysporum</i>	(iii)	Commercial production of ethanol
(4)	<i>Propioni-bacterium sharmanii</i>	(iv)	Production of blood cholesterol lowering agents

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

(1) (iii) (i) (iv) (ii)

(2) (iii) (iv) (i) (ii)

(3) (iv) (iii) (ii) (i)

(4) (iv) (ii) (i) (iii)



- Q.77** Arrange the following events of meiosis in correct sequence -
- (a) Crossing over
 - (b) Synapsis
 - (c) Terminalisation of chiasmata
 - (d) Disappearance of nucleolus
- (1) (b), (c), (d), (a) (2) (b), (a), (d), (c)
(3) (b), (a), (c), (d) (4) (a), (b), (c), (d)
- Q.78** The cutting of DNA at specific locations became possible with the discovery of -
- (1) Ligases
 - (2) Restriction enzymes
 - (3) Probes
 - (4) Selectable markers
- Q.79** During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by -
- (1) Cytochrome (2) Leghaemoglobin
 - (3) Xanthophyll (4) Carotene
- Q.80** Grafted kidney may be rejected in a patient due to -
- (1) Innate immune response
 - (2) Humoral immune response
 - (3) Cell-mediated immune response
 - (4) Passive immune response
- Q.81** The body cell in cockroach discharge their nitrogenous waste in the haemolymph mainly in the form of -
- (1) Calcium carbonate
 - (2) Ammonia
 - (3) Potassium urate
 - (4) Urea
- Q.82** Filiform apparatus is characteristic feature of -
- (1) Synergids
 - (2) Generative cell
 - (3) Nucellar embryo
 - (4) Aleurone cell
- Q.83** Acid rain is caused by increase in the atmospheric concentration of -
- (1) O₃ and dust (2) SO₂ and NO₂
 - (3) SO₃ and CO (4) CO₂ and CO
- Q.84** The wheat grain has an embryo with one large, shield-shaped cotyledon known as -
- (1) Coleoptile (2) Epiblast
 - (3) Coleorrhiza (4) Scutellum



- Q.85** Among china rose, mustard, brinjal, potato, guava, cucumber, onion and tulip, how many plants have superior ovary?
- (1) Four (2) Five
(3) Six (4) Three
- Q.86** Which of the following is **not** a function of the skeletal system?
- (1) Locomotion
(2) Production of erythrocytes
(3) Storage of minerals
(4) Production of body heat
- Q.87** Golden rice is a genetically modified crop plant where the incorporated gene is meant for biosynthesis of -
- (1) Vitamin A (2) Vitamin B
(3) Vitamin C (4) Omega 3
- Q.88** Chromatophores take part in -
- (1) Respiration (2) Photosynthesis
(3) Growth (4) Movement
- Q.89** Select the **wrong** statement -
- (1) Mosaic disease in tobacco and AIDS in human being are caused by viruses
(2) The viroids were discovered by D.J. Ivanowski
(3) W.M. Stanley showed that viruses could be crystallized
(4) The term 'contagium vivum fluidum' was coined by M.W. Beijerinck
- Q.90** A pleiotropic gene -
- (1) Controls multiple traits in an individual
(2) is expressed only in primitive plants
(3) is a gene evolved during Pliocene
(4) controls a trait only in combination with another gene
- Q.91** Human urine is usually acidic because -
- (1) hydrogen ions are actively secreted into the filtrate
(2) the sodium transporter exchanges one hydrogen ion for each sodium ion, in peritubular capillaries
(3) excreted plasma proteins are acidic
(4) Potassium and sodium exchange generates acidity



- Q.92** Auxin can be bioassayed by -
(1) Lettuce hypocotyl elongation
(2) Avena coleoptile curvature
(3) Hydroponics
(4) Potometer
- Q.93** Which of the following events is not associated with ovulation in human female?
(1) LH surge
(2) Decrease in estradiol
(3) Full development of Graafian follicle
(4) Release of secondary oocyte
- Q.94** Body having meshwork of cells, internal cavities lined with food filtering flagellated cells and indirect development are the characteristics of phylum :
(1) Protozoa (2) Coelenterata
(3) Porifera (4) Mollusca
- Q.95** Which one of the following hormones is not involved in sugar metabolism?
(1) Glucagon (2) Cortisone
(3) Aldosterone (4) Insulin
- Q.96** Which of the following diseases is caused by a protozoan?
(1) Blastomycosis (2) Syphilis
(3) Influenza (4) Babesiosis
- Q.97** Outbreeding is an important strategy of animal husbandry because it :
(1) exposes harmful recessive genes that are eliminated by selection.
(2) helps in accumulation of superior genes.
(3) is useful in producing purelines of animals.
(4) is useful in overcoming inbreeding depression.
- Q.98** A childless couple can be assisted to have a child through a technique called GIFT. The full form of this technique is :
(1) Germ cell internal fallopian transfer
(2) Gamete inseminated fallopian transfer
(3) Gamete intra fallopian transfer
(4) Gamete internal fertilization and transfer
- Q.99** A jawless fish, which lays eggs in fresh water and whose ammocoetes larvae after metamorphosis return to the ocean is :
(1) *Petromyzon* (2) *Eptatretus*
(3) *Myxine* (4) *Neomyxine*



Q.100 The structures that help some bacteria to attach to rocks and / or host tissues are :

- (1) Holdfast (2) Rhizoids
- (3) Fimbriae (4) Mesosomes

Q.101 If you suspect major deficiency of antibodies in a person, to which of the following would you look for confirmatory evidence ?

- (1) Serum globulins
- (2) Fibrinogen in plasma
- (3) Serum albumins
- (4) Haemocytes

Q.102 In human females, meiosis-II is not completed until?

- (1) birth
- (2) puberty
- (3) fertilization
- (4) uterine implantation

Q.103 Which of the following layers in an antral follicle is acellular ?

- (1) Zona pellucida
- (2) Granulosa
- (3) Theca interna
- (4) Stroma

Q.104 In his classic experiments on pea plants, Mendel did not use :

- (1) Flower position (2) Seed colour
- (3) Pod length (4) Seed shape

Q.105 Which one of the following fruits is parthenocarpic?

- (1) Banana (2) Brinjal
- (3) Apple (4) Jackfruit

Q.106 In angiosperms, microsporogenesis and megasporogenesis :

- (1) occur in ovule
- (2) occur in anther
- (3) form gametes without further divisions
- (4) Involve meiosis

Q.107 A gene showing codominance has :

- (1) both alleles independently expressed in the heterozygote
- (2) one allele dominant on the other
- (3) alleles tightly linked on the same chromosome
- (4) alleles that are recessive to each other



Q.108 The chitinous exoskeleton of arthropods is formed by the polymerization of :

- (1) lipoglycans
- (2) keratin sulphate and chondroitin sulphate
- (3) D – glucosamine
- (4) N – acetyl glucosamine

Q.109 The imperfect fungi which are decomposers of litter and help in mineral cycling belong to :

- (1) Ascomycetes (2) Deuteromycetes
- (3) Basidiomycetes (4) Phycomycetes

Q.110 The wings of a bird and the wings of an insect are :

- (1) homologous structures and represent convergent evolution
- (2) homologous structures and represent divergent evolution
- (3) analogous structures and represent convergent evolution
- (4) phylogenetic structures and represent divergent evolution

Q.111 Flowers are unisexual in :

- (1) Onion (2) Pea
- (3) Cucumber (4) China rose

Q.112 Increase in concentration of the toxicant at successive trophic levels is known as :

- (1) Biogeochemical cycling
- (2) Biomagnification
- (3) Biodeterioration
- (4) Biotransformation

Q.113 Destruction of the anterior horn cells of the spinal cord would result in loss of :

- (1) integrating impulses
- (2) sensory impulses
- (3) voluntary motor impulses
- (4) commissural impulses

Q.114 Roots play insignificant role in absorption of water in :

- (1) Wheat (2) Sunflower
- (3) *Pistia* (4) Pea



Q.115 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) |
|-----------|-------|------|------|
| (1) (iii) | (iv) | (ii) | (i) |
| (2) (iv) | (iii) | (i) | (ii) |
| (3) (iii) | (iv) | (i) | (ii) |
| (4) (iii) | (i) | (iv) | (ii) |

Q.116 Identify the correct order of organisation of genetic material from largest to smallest :

- (1) Chromosome, genome, nucleotide, gene
- (2) Chromosome, gene, genome, nucleotide
- (3) Genome, chromosome, nucleotide, gene
- (4) Genome, chromosome, gene, nucleotide

Q.117 Which one of the following hormones though synthesised elsewhere, is stored and released by the master gland ?

- (1) Melanocyte stimulating hormone
- (2) Antidiuretic hormone
- (3) Luteinizing hormone
- (4) Prolactin

Q.118 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 :

- (1) Secondary cortex
- (2) Wood
- (3) Secondary phloem
- (4) Phellem

The correct order is :

- (1) (d), (c), (a), (b)
- (2) (c), (d), (b), (a)
- (3) (a), (b), (d), (c)
- (4) (d), (a), (c), (b)



Q.119 Which of the following joints would allow no movement?

- (1) Ball and Socket joint
- (2) Fibrous joint
- (3) Cartilaginous joint
- (4) Synovial joint

Q.120 Which one of the following is not applicable to RNA?

- (1) Chargaff's rule
- (2) Complementary base pairing
- (3) 5' phosphoryl and 3' hydroxyl ends
- (4) Heterocyclic nitrogenous bases

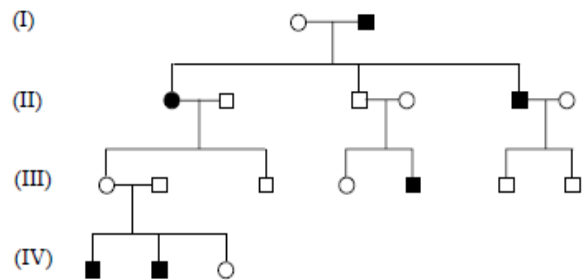
Q.121 Doctors use stethoscope to hear the sounds produced during each cardiac cycle. The second sound is heard when :

- (1) AV node receives signal from SA node
- (2) AV valves open up
- (3) Ventricular walls vibrate due to gushing in of blood from atria
- (4) Semilunar valves close down after the blood flows into vessels from ventricles

Q.122 During ecological succession :

- (1) the changes lead to a community that is in near equilibrium with the environment and is called pioneer community
- (2) the gradual and predictable change in species composition occurs in a given area
- (3) the establishment of a new biotic community is very fast in its primary phase.
- (4) the numbers and types of animals remain constant.

Q.123 In the following human pedigree, the filled symbols represent the affected individuals. Identify the type of given pedigree.



- (1) X-linked dominant
- (2) Autosomal dominant
- (3) X-linked recessive
- (4) Autosomal recessive



Q.124 Balbiani rings are sites of :

- (1) RNA and protein synthesis
- (2) Lipid synthesis
- (3) Nucleotide synthesis
- (4) Polysaccharide synthesis

Q.125 Name the pulmonary disease in which alveolar surface area involved in gas exchange is drastically reduced due to damage in the alveolar walls.

- (1) Asthma
- (2) Pleurisy
- (3) Emphysema
- (4) Pneumonia

Q.126 Which of the following are most suitable indicators of SO_2 pollution in the environment?

- | | |
|--------------|-------------|
| (1) Fungi | (2) Lichens |
| (3) Conifers | (4) Algae |

Q.127 Satellite DNA is important because it :

- (1) codes for enzymes needed for DNA replication.
- (2) codes for proteins needed in cell cycle.
- (3) Shows high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is heritable from parents to children.
- (4) does not code for proteins and is same in all members of the population.

Q.128 Industrial melanism is an example of -

- (1) Neo Lamarckism
- (2) Neo Darwinism
- (3) Natural selection
- (4) Mutation

Q.129 A column of water within xylem vessels of tall trees does not break under its weight because of -

- (1) Positive root pressure
- (2) Dissolved sugars in water
- (3) Tensile strength of water
- (4) Lignification of xylem vessels



Q.130 The introduction of t-DNA into plants involves -

- (1) Allowing the plant roots to stand in water
- (2) Infection of the plant by *Agrobacterium tumefaciens*
- (3) Altering the pH of the soil, then heat-shocking the plants
- (4) Exposing the plants to cold for a brief period

Q.131 Pick up the wrong statement :

- (1) Nuclear membrane is present in Monera
- (2) Cell wall is absent in Animalia
- (3) Protista have photosynthetic and heterophic modes of nutrition
- (4) Some fungi are edible

Q.132 In photosynthesis, the light-independent reactions take place at :

- (1) Stromal matrix (2) Thylakoid lumen
- (3) Photosystem I (4) Photosystem II

Q.133 Which of the following immunoglobulins does constitute the largest percentage in human milk?

- (1) IgG (2) IgD
- (3) IgM (4) IgA

Q.134 Which of the following pairs is not correctly matched?

Mode of reproduction	Example
(1) Conidia	<i>Penicillium</i>
(2) Offset	Water hyacinth
(3) Rhizome	Banana
(4) Binary fission	<i>Sargassum</i>

Q.135 The UN conference of Parties on climate change in the year 2012 was held at :

- (1) Warsaw
- (2) Durban
- (3) Doha
- (4) Lima



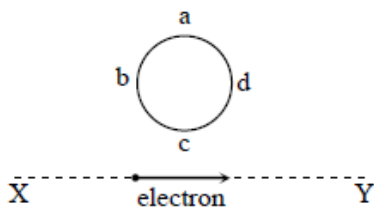
Q.136 In the spectrum of hydrogen, the ratio of the longest wavelength in the Lyman series to the longest wavelength in the Balmer series is :

- (1) $\frac{5}{27}$ (2) $\frac{4}{9}$
(3) $\frac{9}{4}$ (4) $\frac{27}{5}$

Q.137 The energy of the em waves is of the order of 15 keV. To which part of the spectrum does it belong ?

- (1) γ -rays (2) X-rays
(3) Infra - red rays (4) Ultraviolet rays

Q.138 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 ?



- (1) No current induced
(2) abcd
(3) adcb
(4) The current will reverse its direction as the electron goes past the coil

Q.139 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 :

- (1) $\frac{V^2R}{nr}$ (2) $\frac{VR^2}{n^2r^2}$
(3) $\frac{VR^2}{nr^2}$ (4) $\frac{VR^2}{n^3r^2}$

Q.140 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 ratio of :

- (1) 1 : 1 (2) 1 : 2
(3) 2 : 1 (4) 4 : 1

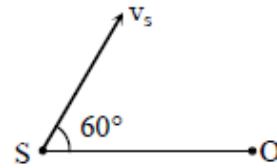
Q.141 A potentiometer wire of length L and a resistance r are connected in series with a battery of e.m.f. E_0 and a resistance r_1 . An unknown e.m.f. E is balanced at a length ℓ of the potentiometer wire. The e.m.f. E will be given by :

- (1) $\frac{LE_0r}{(r+r_1)\ell}$ (2) $\frac{LE_0r}{\ell r_1}$
(3) $\frac{E_0r}{(r+r_1)} \frac{\ell}{L}$ (4) $\frac{E_0\ell}{L}$



Q.142 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:

- (1) $\frac{2\pi\beta}{\alpha}$ (2) $\frac{\beta^2}{\alpha^2}$
(3) $\frac{\alpha}{\beta}$ (4) $\frac{\beta^2}{\alpha}$



- (1) 97 Hz (2) 100 Hz
(3) 103 Hz (4) 106 Hz

Q.143 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 time, then the value of t at which they are orthogonal to each other is :

- (1) $t = 0$ (2) $t = \frac{\pi}{4\omega}$
(3) $t = \frac{\pi}{2\omega}$ (4) $t = \frac{\pi}{\omega}$

Q.144 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 :

Q.145 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 :

- (1) $2.86 \text{ kg m}^2 \text{ s}^{-2}$ (2) $6.66 \text{ kg m}^2 \text{ s}^{-2}$
(3) $8.58 \text{ kg m}^2 \text{ s}^{-2}$ (4) $10.86 \text{ kg m}^2 \text{ s}^{-2}$

Q.146 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 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 the coil in stable equilibrium will be :

- (1) 0.12 Nm (2) 0.15 Nm
(3) 0.20 Nm (4) 0.24 Nm



Q.147 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 :

- (1) $\frac{C^2V^2}{2d^2}$ (2) $\frac{C^2V^2}{2d}$
(3) $\frac{CV^2}{2d}$ (4) $\frac{CV^2}{d}$

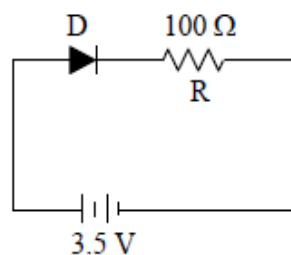
Q.148 Two vessels separately contain two ideal gases A and B at the same temperature, the pressure of A being twice that of B. Under such conditions, the density of A is found to be 1.5 times the density of B. The ratio of molecular weight of A and B is :

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

Q.149 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,

- (1) the acceleration of S is always directed towards the centre of the earth.
(2) the angular momentum of S about the centre of the earth changes in direction, but its magnitude remains constant.
(3) the total mechanical energy of S varies periodically with time
(4) the linear momentum of S remains constant in magnitude.

Q.150 In the given figure, a diode D is connected to an external resistance $R = 100 \Omega$ and an e.m.f. of 3.5 V. If the barrier potential developed across the diode is 0.5V, the current in the circuit will be:



- (1) 35 mA (2) 30 mA
(3) 40 mA (4) 20 mA



Q.151 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 $g = 9.8 \text{ ms}^{-2}$, then the orbital speed of the satellite is :

- (1) 6.67 km s^{-1} (2) 7.76 km s^{-1}
(3) 8.56 km s^{-1} (4) 9.13 km s^{-1}

Q.152 The position vector of a particle \vec{R} as a function of time is given by :

$$\vec{R} = 4 \sin(2\pi t) \hat{i} + 4\cos(2\pi t) \hat{j}$$

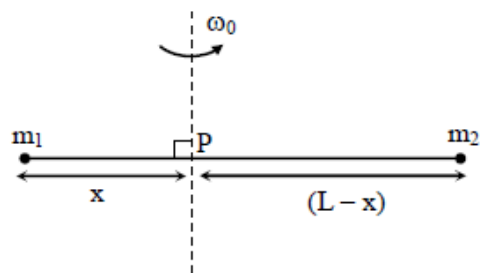
Where R is in meters, t is in seconds and \hat{i} and \hat{j} denote unit vectors along x-and y-directions, respectively. Which one of the following statements is wrong for the motion of particle ?

- (1) Path of the particle is a circle of radius 4 meter
(2) Acceleration vector is along $-\vec{R}$.
(3) Magnitude of acceleration vector is $\frac{v^2}{R}$,
where v is the velocity of particle
(4) Magnitude of the velocity of particle is 8 meter/ second

Q.153 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 are no other resonant frequencies between these two. The lowest resonant frequency for this string is :

- (1) 105 Hz (2) 155 Hz
(3) 205 Hz (4) 10.5 Hz

Q.154 Point masses m_1 and m_2 are placed at the opposite ends of a 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 :



- (1) $x = \frac{m_2 L}{m_1 + m_2}$ (2) $x = \frac{m_1 L}{m_1 + m_2}$
(3) $x = \frac{m_1}{m_2} L$ (4) $x = \frac{m_2}{m_1} L$



Q.155 At the first minimum adjacent to the central maximum of a single-slit diffraction pattern, the phase difference between the Huygen's wavelet from the edge of the slit and the wavelet from the midpoint of the slit is :

- (1) $\frac{\pi}{8}$ radian (2) $\frac{\pi}{4}$ radian
(3) $\frac{\pi}{2}$ radian (4) π radian

Q.156 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 :

- (1) 1 (2) -1
(3) 2 (4) zero

Q.157 Two particles A and B, move with constant velocities \vec{v}_1 and \vec{v}_2 . At the initial moment their position vectors are \vec{r}_1 and \vec{r}_2 respectively. The condition for particles A and B for their collision is :

- (1) $\vec{r}_1 - \vec{r}_2 = \vec{v}_1 - \vec{v}_2$
(2) $\frac{\vec{r}_1 - \vec{r}_2}{|\vec{r}_1 - \vec{r}_2|} = \frac{\vec{v}_2 - \vec{v}_1}{|\vec{v}_2 - \vec{v}_1|}$
(3) $\vec{r}_1 \cdot \vec{v}_1 = \vec{r}_2 \cdot \vec{v}_2$
(4) $\vec{r}_1 \times \vec{v}_1 = \vec{r}_2 \times \vec{v}_2$

Q.158 A nucleus of uranium decays at rest into nuclei of thorium and helium. Then :

- (1) The helium nucleus has less kinetic energy than the thorium nucleus
(2) The helium nucleus has more kinetic energy than the thorium nucleus
(3) The helium nucleus has less momentum than the thorium nucleus
(4) The helium nucleus has more momentum than the thorium nucleus.

Q.159 Two metal wires of identical dimensions are connected in series. If σ_1 and σ_2 are the conductivities of the metal wires respectively, the effective conductivity of the combination is :

- (1) $\frac{\sigma_1\sigma_2}{\sigma_1 + \sigma_2}$ (2) $\frac{2\sigma_1\sigma_2}{\sigma_1 + \sigma_2}$
(3) $\frac{\sigma_1 + \sigma_2}{2\sigma_1\sigma_2}$ (4) $\frac{\sigma_1 + \sigma_2}{\sigma_1\sigma_2}$



Q.160 Light of wavelength 500 nm is incident on a metal with work function 2.28 eV. The de Broglie wavelength of the emitted electron is

:

(1) $\leq 2.8 \times 10^{-12} \text{ m}$

(2) $< 2.8 \times 10^{-10} \text{ m}$

(3) $< 2.8 \times 10^{-9} \text{ m}$

(4) $\geq 2.8 \times 10^{-9} \text{ m}$

Q.161 4.0 g of a gas occupies 22.4 liters at NTP.

The specific heat capacity of the gas at constant volume is $5.0 \text{ JK}^{-1} \text{ mol}^{-1}$. 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 $R = 8.3 \text{ JK}^{-1} \text{ mol}^{-1}$)

(1) $8.5 \text{ JK}^{-1} \text{ mol}^{-1}$

(2) $8.0 \text{ JK}^{-1} \text{ mol}^{-1}$

(3) $7.5 \text{ JK}^{-1} \text{ mol}^{-1}$

(4) $7.0 \text{ JK}^{-1} \text{ mol}^{-1}$

Q.162 A series R-C circuit is connected to an alternating voltage source. Consider two situations:

(a) When capacitor is air filled.

(b) When capacitor is mica filled.

Current through resistor is i and voltage across capacitor is V then :

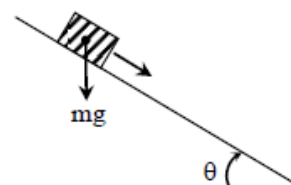
(1) $V_a = V_b$

(2) $V_a < V_b$

(3) $V_a > V_b$

(4) $i_a > i_b$

Q.163 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 :



(1) 0.4 and 0.3

(2) 0.6 and 0.6

(3) 0.6 and 0.5

(4) 0.5 and 0.6



Q.164 Two stones of masses m and $2m$ are whirled in horizontal circles, the heavier one in a radius $\frac{r}{2}$ and 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 :

- (1) 1 (2) 2
(3) 3 (4) 4

Q.165 The coefficient of performance of a refrigerator is 5. If the temperature inside freezer is -20°C , the temperature of the surroundings to which it rejects heat is :

- (1) 21°C (2) 31°C
(3) 41°C (4) 11°C

Q.166 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 ?

- (1) Isothermal (2) Adiabatic
(3) Isobaric (4) Isochoric

Q.167 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 $g = 10 \text{ ms}^{-2}$)

- (1) 10 ms^{-1} (2) 14 ms^{-1}
(3) 20 ms^{-1} (4) 28 ms^{-1}

Q.168 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 :

- (1) $\frac{\sqrt{3}}{2}v$ (2) $\frac{2\sqrt{2}}{3}v$
(3) $\frac{3}{4}v$ (4) $\frac{3}{\sqrt{2}}v$

Q.169 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 :

- (1) $-(6\hat{i} + 9\hat{j} + \hat{k})$ (2) $-(3\hat{i} + 5\hat{j} + 3\hat{k})$
(3) $-(6\hat{i} + 5\hat{j} + 2\hat{k})$ (4) $-(2\hat{i} + 3\hat{j} + \hat{k})$



Q.170 Two slits in Youngs 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 :

- (1) $\frac{4}{9}$ (2) $\frac{9}{4}$
(3) $\frac{121}{49}$ (4) $\frac{49}{121}$

Q.171 The heart of a man pumps 5 liters of blood through the arteries per minute at a pressure of 150 mm of mercury. If the density of mercury be $13.6 \times 10^3 \text{ kg/m}^3$ and $g = 10 \text{ m/s}^2$, then the power of heart in watt is :

- (1) 1.50 (2) 1.70
(3) 2.35 (4) 3.0

Q.172 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 1MeV, the energy acquired by alpha particle will be :

- (1) 1 MeV
(2) 4 MeV
(3) 0.5 MeV
(4) 1.5 MeV

Q.173 The input signal given to a CE amplifier having a voltage gain of 150 is $V_i = 2 \cos \left(15t + \frac{\pi}{3} \right)$. The corresponding output signal will be :

- (1) $300 \cos \left(15t + \frac{4\pi}{3} \right)$
(2) $300 \cos \left(15t + \frac{\pi}{3} \right)$
(3) $75 \cos \left(15t + \frac{2\pi}{3} \right)$
(4) $2 \cos \left(15t + \frac{5\pi}{6} \right)$

Q.174 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 :

- (1) 1, 1, 1
(2) 1, -1, -1
(3) -1, -1, 1
(4) -1, -1, -1



Q.175 A circuit contains an ammeter, a battery of 30 V and a resistance 40.8 ohm all connected in series. If the ammeter has a coil of resistance 480 ohm and a shunt of 20 ohm, the reading in the ammeter will be :

- (1) 1 A
- (2) 0.5 A
- (3) 0.25 A
- (4) 2 A

Q.176 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 :

- (1) Water does not rise at all.
- (2) water rises upto the tip of capillary tube and then starts overflowing like a fountain.
- (3) water rises upto the top of capillary tube and stays there without overflowing.
- (4) water rises upto a point a little below the top and stays there

Q.177 In an astronomical telescope in normal adjustment a straight black line of length L is drawn on inside part of objective lens. The eye-piece forms a real image of this line. The length of the image is I. The magnification of the telescope is :

- (1) $\frac{L}{I}$
- (2) $\frac{L}{I} + 1$
- (3) $\frac{L}{I} - 1$
- (4) $\frac{L + I}{L - I}$

Q.178 The value of coefficient of volume expansion of glycerin is $5 \times 10^{-4} \text{ K}^{-1}$. The fractional change in the density of glycerin for a rise of 40°C in its temperature, is :

- (1) 0.010
- (2) 0.015
- (3) 0.020
- (4) 0.025

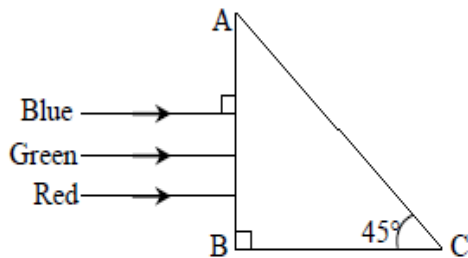
Q.179 A photoelectric surface is illuminated successively by monochromatic light of wavelength λ and $\frac{\lambda}{2}$. If the maximum kinetic energy of the emitted photoelectrons in the second case is 3 times that in the first case, the work function of the surface of the material is :

(h = Planck's constant, c = speed of light)

- (1) $\frac{hc}{3\lambda}$
- (2) $\frac{hc}{2\lambda}$
- (3) $\frac{hc}{\lambda}$
- (4) $\frac{2hc}{\lambda}$



Q.180 A beam of light consisting of red, green and blue colors is incident on a right angle 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 :

- (1) separate the red colour part from the green and blue colours
- (2) separate the blue colour part from the red and green colours
- (3) separate all the three colours from one another
- (4) not separate the three colours at all