NEET-UG EXAMINATION PAPER-2008

(Solved)

Time allowed : 3 hours | Maximum Marks : 799

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **200 questions.** All questions are **compulsory.**

ii. This question paper is divided into **1 sections.**

iii. **Section A** – questions number **1 to 200** are multiple choice questions

iv. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

v. Use of calculator is NOT allowed.

Section A

Question 1.

Which two of the following five physical parameters have the same dimensions?

(A) Energy density

(B) Refractive index

(C) Dielectric constant

(D) Young's modulus

(E) Magnetic field

[4 Marks]

(A) (A) and (E)

(B) (A) and (D)

(C) (C) and (E)

(D) (B) and (D)

Question 2.

If the error in the measurement of radius of a sphere is 2%, then the error in the determination of volume of the sphere will be:

[4 Marks]

(A) 6%

(B) 2%

(C) 4%

(D) 8%

Question 3.

The distance travelled by a particle starting from rest and moving with an acceleration $(4 / 3)\ ms^{-2}$, in the third second is:

[4 Marks]

(A) 6m

(B) 4m

(C) (19 / 3) m

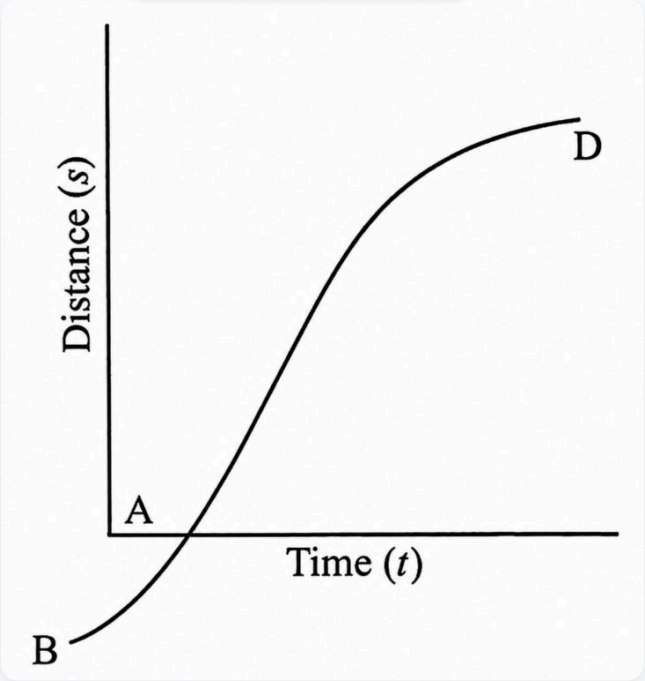
(D) (10 / 3)m

Question 4.

A particle shows distance–time curve as given in this figure.

The maximum instantaneous velocity of the particle is around the point:

[4 Marks]



(A) A

(B) D

(C) B

(D) C

Question 5.

A particle moves in a straight line with a constant acceleration. It changes its velocity from 10 ms^{-1} to 20 ms^{-1} while passing through a distance 135 m in t second. The value of t is:

[4 Marks]

(A) 9

(B) 10

(C) 12

(D) 1.8

Question 6.

A particle of mass m is projected with velocity v making an angle of 45° with the horizontal. When the particle lands on the level ground the magnitude of the change in its momentum will be:

[4 Marks]

(A) 2 mv

(B) mv / √2

(C) zero

(D) mv√2

Question 7.

Sand is being dropped on a conveyor belt at the rate of M kg/s. The force necessary to keep the belt moving with a constant velocity of v m/s will be:

[4 Marks]

(A) zero

(B) 2 Mv newton

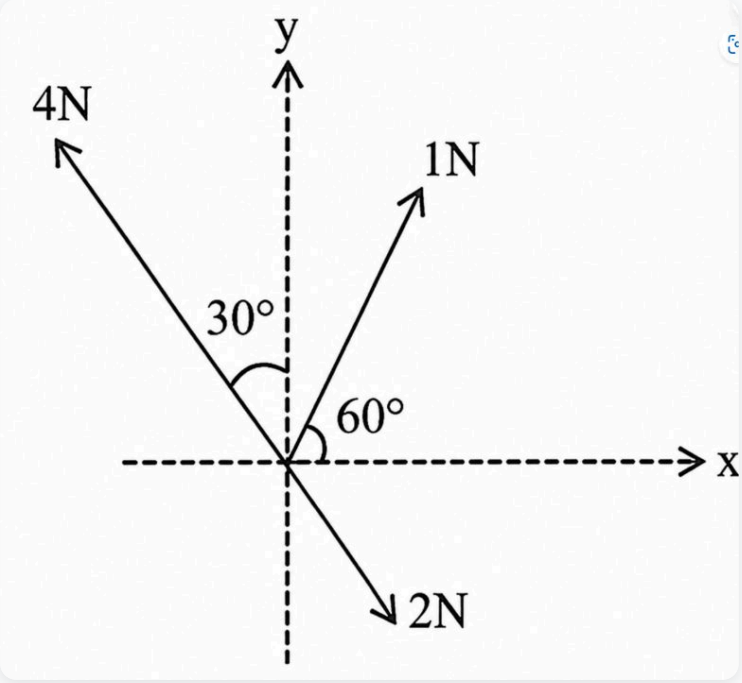
(C) (Mv / 2) newton

(D) Mv newton

Question 8.

Three forces acting on a body are shown in the figure. To have the resultant force only along the y-direction, the magnitude of the minimum additional force needed is:

[4 Marks]



(A) √3 N

(B) 0.5 N

(C) (√3 / 4) N

(D) 1.5 N

Question 9.

Water falls from a height of 60 m at the rate of 15 kg/s to operate a turbine. The losses due to frictional force are 10% of energy. How much power is generated by the turbine? (g = 10 m/s²)

[4 Marks]

(A) 10.2 kW

(B) 7.0 kW

(C) 8.1 kW

(D) 12.3 kW

Question 10.

A shell of mass 200 gm is ejected from a gun of mass 4 kg by an explosion that generates 1.05 kJ of energy. The initial velocity of the shell is:

[4 Marks]

(A) 120 ms^{-1}

(B) 100 ms^{-1}

(C) 40 ms^{-1}

(D) 80 ms^{-1}

Question 11.

The ratio of radii of gyration of a circular ring and a circular disc, of the same mass and radius, about an axis passing through their centres and perpendicular to their planes are:

[4 Marks]

(A) 3 : 2

(B) √2 : 1

(C) 2 : 1

(D) 1 : √2

Question 12.

A thin rod of length L and mass M is bent at its midpoint into two halves so that the angle between them is 90°. The moment of inertia of the bent rod about an axis passing through the bending point and perpendicular to the plane defined by the two halves of the rod is:

[4 Marks]

(A) $ML^2 / 12$

(B) $ML^2 / 24$

(C) $ML^2 / 6$

(D) $\sqrt{2}ML^2 / 24$

Question 13.

A roller coaster is designed such that riders experience “weightlessness” as they go round the top of a hill whose radius of curvature is 20 m. The speed of the car at the top of the hill is between:

[4 Marks]

(A) 14 m/s and 15 m/s

(B) 16 m/s and 17 m/s

(C) 15 m/s and 16 m/s

(D) 13 m/s and 14 m/s

Question 14.

On a new scale of temperature (which is linear) and called the W scale, the freezing and boiling points of water are 39° W and 239° W respectively. What will be the temperature on the new scale, corresponding to a temperature of 39° C on the Celsius scale?

[4 Marks]

(A) 200° W

(B) 139° W

(C) 117° W

(D) 78° W

Question 15.

An electric kettle takes 4 A current at 220 V. How much time will it take to boil 1 kg of water from temperature 20° C? The temperature of boiling water is 100° C.

[4 Marks]

(A) 12.6 min

(B) 4.2 min

(C) 6.3 min

(D) 8.4 min

Question 16.

If Q, E and W denote respectively the heat added, change in internal energy and the work done in a closed cyclic process, then:

[4 Marks]

(A) W = 0

(B) Q = W = 0

(C) E = 0

(D) Q = 0

Question 17.

At 10°C the value of the density of a fixed mass of an ideal gas divided by its pressure is x. At 110°C this ratio is:

[4 Marks]

(A) x

(B) (383 / 283)x

(C) (283 / 383)x

(D) (10 / 110)x

Question 18.

Two simple harmonic motions of angular frequency 100 and 1000 rad s^{-1} have the same displacement amplitude. The ratio of their maximum acceleration is:

[4 Marks]

(A) $1 : 10^3$

(B) $1 : 10$

(C) $1 : 10^4$

(D) $1 : 10^2$

Question 19.

A point performs simple harmonic oscillation of period T and the equation of motion is given by $x = a \sin(\omega t + \pi / 6)$. After the elapse of what fraction of the time period the velocity of the point will be equal to half of its maximum velocity?

[4 Marks]

(A) T / 8

(B) T / 3

(C) T / 6

(D) T / 12

Question 20.

The wave described by $y=0.25\sin(10\pi x-2\pi t)$,

where x and y are in meters and t in seconds, is a wave travelling along the:

[4 Marks]

(A) −ve x direction with frequency 1 Hz.

(B) +ve x direction with frequency π Hz and wavelength $\lambda = 0.2$ m.

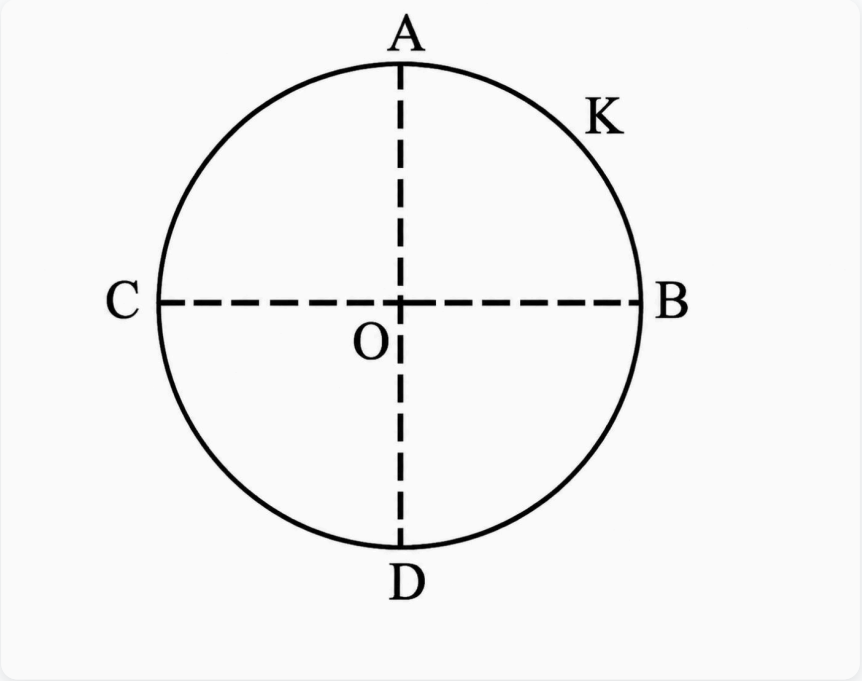
(C) +ve x direction with frequency 1 Hz and wavelength $\lambda = 0.2$ m.

(D) −ve x direction with amplitude 0.25 m and wavelength $\lambda = 0.2$ m

Question 21.

A thin conducting ring of radius R is given a charge +Q. The electric field at the centre O of the ring due to the charge on the part AKB of the ring is E. The electric field at the centre due to the charge on the part ACDB of the ring is

[4 Marks]



(A) E along KO

(B) E along KO

(C) E along OK

(D) 3 E along OK

Question 22.

The electric potential at a point in free space due to a charge Q coulomb is $Q \times 10^{11}$ volts. The electric field at that point is

[4 Marks]

(A) $12\pi\varepsilon_0$ $Q \times 10^{22}$ volt/m

(B) $4\pi\varepsilon_0$ $Q \times 10^{22}$ volt/m

(C) $12\pi\varepsilon_0$ $Q \times 10^{20}$ volt/m

(D) $4\pi\varepsilon_0$ $Q \times 10^{20}$ volt/m

Question 23.

A parallel plate capacitor has a uniform electric field E in the space between the plates. If the distance between the plates is d and area of each plate is A, the energy stored in the capacitor is:

[4 Marks]

(A) $(1 / 2) \varepsilon_0 E^2$

(B) E^2Ad / ε_0

(C) $\varepsilon_0 EAd$

(D) $(1 / 2) \varepsilon_0 E^2 Ad$

Question 24.

A wire of a certain material is stretched slowly by ten per cent. Its new resistance and specific resistance become respectively:

[4 Marks]

(A) 1.21 times, same

(B) 1.1 times, 1.1 times

(C) both remain the same

(D) 1.2 times, 1.3 times

Question 25.

Bacterial leaf blight of rice is caused by a species of

[4 Marks]

(A) Erwinia

(B) Alternaria

(C) Pseudomonas

(D) Xanthomonas

Question 26.

In the light of recent classification of living organisms into three domains of life (bacteria, archaea and eukarya), which one of the following statements is true about archaea?

[4 Marks]

(A) Archaea completely differ from prokaryotes

(B) Archaea have some novel features that are absent in other prokaryotes and eukaryotes

(C) Archaea completely differ form both prokaryotes and eukaryotes

(D) Archaea resemble eukarya in all respects

Question 27.

Thermococcus, Methanococcus and Methan-obacterium exemplify:

[4 Marks]

(A) Bacteria whose DNA is relaxed or positively supercoiled but which have a cytoskeleton as well as mitochondria

(B) Bacteria that contain a cytoskeleton and ribosomes

(C) Archaebacteria that contain protein homologous to eukaryotic core histones

(D) Archaebacteria that lack any histones resembling those found in eukaryotes but whose DNA is negatively supercoiled

Question 28.

In which one of the following, male and female gametophytes do not have free living independent existence?

[4 Marks]

(A) Polytrichum

(B) Cedrus

(C) Funaria

(D) Pteris

Question 29.

Which one of the following is heterosporous?

[4 Marks]

(A) Salvinia

(B) Dryopteris

(C) Equisetum

(D) Adiantum

Question 30.

Select one of the following pairs of important features distinguishing Gnetum from Cycas and Pinus and showing affinities with angiosperms

[4 Marks]

(A) absence of resin duct and leaf venation

(B) perianth and two integuments

(C) embryo development and apical meristem

(D) presence of vessel elements and absence of archegonia

Question 31.

Ascaris is characterized by

[4 Marks]

(A) presence of true coelom and metamerism (metamerisation)

(B) presence of true coelom but absence of metamerism

(C) presence of neither true coelom nor metamerism

(D) absence of true coelom but presence of metamerism

Question 32.

Which one of the following is NOT a characteristic of phylum Annelida?

[4 Marks]

(A) Ventral nerve cord

(B) Pseudocoelom

(C) Segmentation

(D) Closed circulatory system

Question 33.

Which one of the following phyla is correctly matched with its two general characteristics?

[4 Marks]

(A) Mollusca - Normally oviparous and development through a trochophore or veliger larva

(B) Echinodermata - Pentamerous radial symmetry and mostly internal fertilization

(C) Arthropoda – Body divided into head, thorax and abdomen and respiration by tracheae

(D) Chordata – Notochord at some stage and separate anal and urinary openings to the outside

Question 34.

Which one of the following groups of three animals each is correctly matched with their one characteristic morphological feature?

[4 Marks]

(A)

Animals		Morphological feature
Liver fluke, Sea anemone, Sea	-	Bilateral symmetry

(B)

Animals		Morphological feature
Centipede, Prawn Sea urchin	-	Jointed appendages

(C)

Animals		Morphological feature
Scorpion, Spider, Cockroach	-	Ventral solid central nervous system

(D)

Animals		Morphological feature
Cockroach, Locust, Taenia	-	Metameric segmentation

Question 35.

Which one of the following is the true description about an animal concerned?

[4 Marks]

(A) Cockroach – 10 pairs of spiracles (2 pairs on thorax and 8 pairs on abdomen)

(B) Rat – Left kidney is slightly higher in position than the right one

(C) Frog – Body divisible into three regions – head, neck and trunk

(D) Earthworm – The alimentary canal consists of a sequence of pharynx, oesophagus, stomach, gizzard and intestine

Question 36.

Replum is present in the ovary of flower of

[4 Marks]

(A) Pea

(B) Sun flower

(C) Lemon

(D) Mustard

Question 37.

The length of different internodes in a culm of sugarcane is variable because of

[4 Marks]

(A) shoot apical meristem

(B) position of axillary buds

(C) intercalary meristem

(D) size of leaf lamina at the node below each internode

Question 38.

Vascular tissues in flowering plants develop from

[4 Marks]

(A) phellogen

(B) plerome

(C) periblem

(D) dermatogen

Question 39.

Which one of the following is resistant to enzyme action?

[4 Marks]

(A) Cork

(B) Wood fibre

(C) Leaf cuticle

(D) Pollen exine

Question 40.

Earthworms have no skeleton but during burrowing, the anterior end becomes turgid and acts as a hydraulic skeleton. It is due to

[4 Marks]

(A) setae

(B) gut peristalsis

(C) coelomic fluid

(D) blood

Question 41.

Keeping in view the fluid mosaic model for the structure of cell membrane, which one of the following statements is correct with respect to movement of lipids and proteins from one lipid monolayer to the other (described as flip-flop movement)?

[4 Marks]

(A) Both lipids and proteins can flip-flop

(B) While lipids can rarely flip-flop, protein can not

(C) Neither lipids, nor proteins can flip-flop

(D) While proteins can flip-flop, lipids can not

Question 42.

Cellulose is the major component of cell walls of

[4 Marks]

(A) Pseudomonas

(B) Saccharomyces

(C) Xanthomonas

(D) Pyhtium

Question 43.

The two sub-units of ribosome remain united at critical ion level of

[4 Marks]

(A) magnesium

(B) calcium

(C) copper

(D) manganese

Question 44.

Vacuole in a plant cell

[4 Marks]

(A) lacks membrane and contains air

(B) lacks membrane and contains water and excretory substances

(C) is membrane-bound and contains water and excretory substances

(D) is membrane-bound and contains storage proteins and lipids

Question 45.

A competitive inhibitor of succinic dehydrogenase is

[4 Marks]

(A) m-ketoglutarate

(B) Malate

(C) Oxaloacetate

(D) Malonate

Question 46.

The rupture and fractionation do not usually occur in the water column in vessel/tracheids during the ascent of sap because of

[4 Marks]

(A) weak gravitational pull

(B) transpiration pull

(C) cohesion and adhesion

(D) lignified thick walls

Question 47.

Carbohydrates are commonly found as starch in plant storage organs. Which of the following five properties of starch (A–E) make it useful as a storage material?

(A) Easily translocated

(B) Chemically non-reactive

(C) Easily digested by animals

(D) Osmotically inactive

(E) Synthesized during photosynthesis

The useful properties are

[4 Marks]

(A) (A) and (E)

(B) (A), (C) and (E)

(C) (B) and (D)

(D) (B) and (C)

Question 48.

Nitrogen fixation in root nodules of Alnus is brought about by:

[4 Marks]

(A) Azorhizobium

(B) Frankia

(C) Clostridium

(D) Bradyrhizobium

Question 49.

Electrons from excited chlorophyll molecule of photosystem II are accepted first by:

[4 Marks]

(A) Cytochrome-f

(B) Cytochrome-b

(C) Quinone

(D) Ferredoxin

Question 50.

In leaves of C_4 plants malic acid synthesis during CO_2 fixation occurs in

[4 Marks]

(A) guard cells

(B) bundle sheath

(C) mesophyll cells

(D) epidermal cells

Question 51.

The energy-releasing process in which the substrate is oxidised without an external electron acceptor is called

[4 Marks]

(A) glycolysis

(B) aerobic respiration

(C) photorespiration

(D) fermentation

Question 52.

The chemiosmotic coupling hypothesis of oxidative phosphorylation proposes that adenosine triphosphate (ATP) is formed because:

[4 Marks]

(A) there is a change in the permeability of the inner mitochondrial membrane toward adenosine diphosphate (ADP)

(B) a proton gradient forms across the inner membrane

(C) ADP is pumped out of the matrix into the intermembrane space

(D) high energy bonds are formed in mitochondrial proteins

Question 53.

In germinating seeds fatty acids are degraded exclusively in the

[4 Marks]

(A) peroxisomes

(B) mitochondria

(C) proplastids

(D) glyoxysomes

Question 54.

Senescence as an active developmental cellular process in the growth and functioning of a flowering plant, is indicated in

[4 Marks]

(A) floral parts

(B) leaf abscission

(C) annual plants

(D) vessels and tracheid differentiation

Question 55.

Importance of day length in flowering of plants was first shown in

[4 Marks]

(A) lemma

(B) tobacco

(C) cotton

(D) petunia

Question 56.

Which one of the following is the correct matching of the site of action on the given substrate, the enzyme acting upon it and the end product?

[4 Marks]

(A) Stomach: Fats Micelles

(B) Small intestine: Proteins Amino acids

(C) Duodenum: Triglycerides Monoglycerides

(D) Small intestine: Starch Disaccharide (Maltose)

Question 57.

What will happen if the secretion of parietal cells of gastric glands is blocked with an inhibitor?

[4 Marks]

(A) Enterokinase will not be released from the duodenal mucosa and so trypsinogen is not converted to trypsin

(B) In the absence of HCl secretion, inactive pepsinogen is not converted into the active enzyme pepsin

(C) Gastric juice will be deficient in pepsinogen

(D) Gastric juice will be deficient in chymosin

Question 58.

Which type of white blood cells are concerned with the release of histamine and the natural anti-coagulant heparin?

[4 Marks]

(A) Monocytes

(B) Eosinophils

(C) Neutrophils

(D) Basophils

Question 59.

The most active phagocytic white blood cells are:

[4 Marks]

(A) eosinophils and lymphocytes

(B) neutrophils and monocytes

(C) neutrophils and eosinophils

(D) lymphocytes and macrophages

Question 60.

The haemoglobin of a human foetus

[4 Marks]

(A) has a lower affinity for oxygen than that of the adult.

(B) has affinity for oxygen the same as that of an adult.

(C) has only 2 protein subunits instead of 4.

(D) has a higher affinity for oxygen than that of an adult.

Question 61.

In humans, blood passes from the post caval to the diastolic right atrium of heart due to

[4 Marks]

(A) suction pull

(B) pushing open of the venous valves

(C) stimulation of the sino auricular node

(D) pressure difference between the post caval and atrium

Question 62.

Which one of the following items gives its correct total number?

[4 Marks]

(A) Cervical vertebrae in humans – 8

(B) Types of diabetes – 3

(C) Floating ribs in humans – 4

(D) Amino acids found in proteins – 16

Question 63.

During the propagation of a nerve impulse, the action potential results from the movement of:

[4 Marks]

(A) Na^+ ions from extracellular fluid to intracellular fluid

(B) Na^+ ions from intracellular fluid to extracellular fluid

(C) K^+ ions from extracellular fluid to intracellular fluid

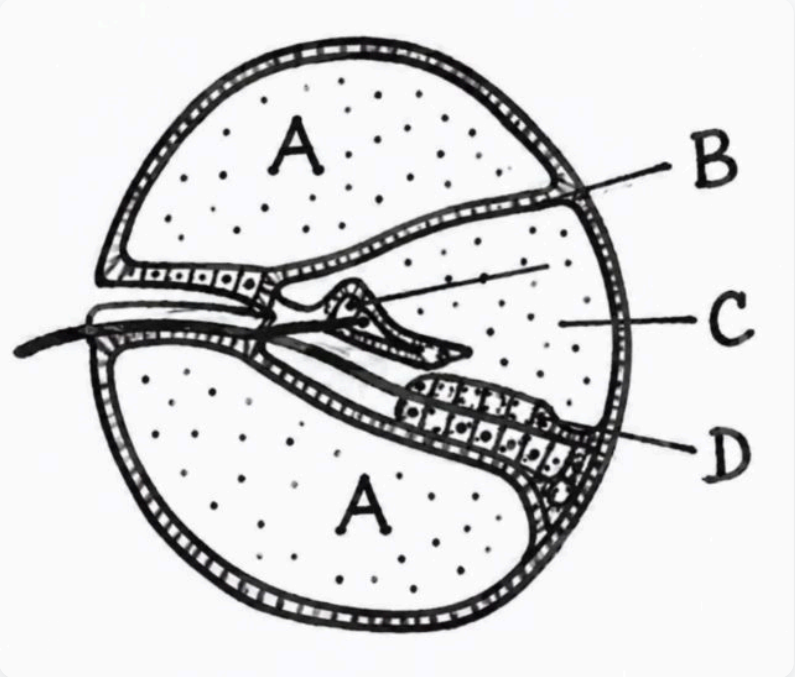
(D) K^+ ions from intracellular fluid to extracellular fluid

Question 64.

Given below is a diagrammatic cross section of a single loop of human cochlea:

Which one of the following options correctly represents the names of three different parts?

[4 Marks]



(A) D: Sensory hair cells, A: Endolymph, B: Tectorial membrane

(B) A: Perilymph, B: Tectorial membrane, C: Endolymph

(C) B: Tectorial membrane, C: Perilymph, D: Secretory cells

(D) C: Endolymph, D: Sensory hair cells, A: Serum

Question 65.

Which one of the following is the correct difference between Rod Cells and Cone Cells of our retina?

[4 Marks]

(A)

	Rod Cells	Cone Cells
Visual: acuity	High	Low

(B)

	Rod Cells	Cone Cells
Visual : pigment contained	Iodops	in Rhodpsin

(C)

	Rod Cells	Cone Cells
Overall : function	Vision in poor light	Colour vision and detailed vision in bright light

(D)

	Rod Cells	Cone Cells
Distribu-tion :	More conc-entrated in retina	Evenly distributed all over

Question 66.

A cell can be balanced against 110 cm and 100 cm of potentiometer wire, respectively with and without being short circuited through a resistance of 10Q. Its internal resistance is

[4 Marks]

(A) 2.0 ohm

(B) zero

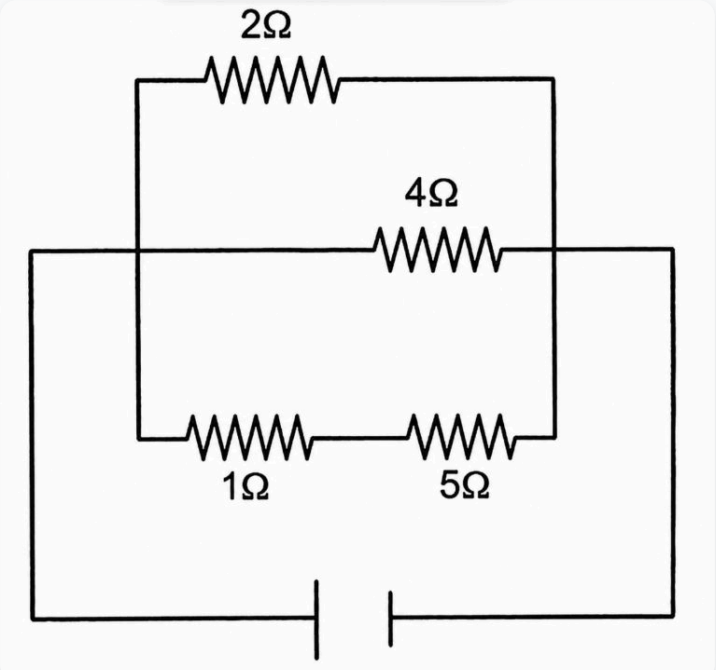
(C) 0.5 ohm

(D) 1.0 ohm

Question 67.

A current of 3 amp flows through the 2Ω resistor shown in the circuit. The power dissipated in the 5-Ω resistor is:

[4 Marks]



(A) 1 watt

(B) 5 watt

(C) 4 watt

(D) 2 watt

Question 68.

A particle of mass m, charge Q and kinetic energy T enters a transverse uniform magnetic field of induction □□. After 3 seconds, the kinetic energy of the particle will be:

[4 Marks]

(A) 3T

(B) 2T

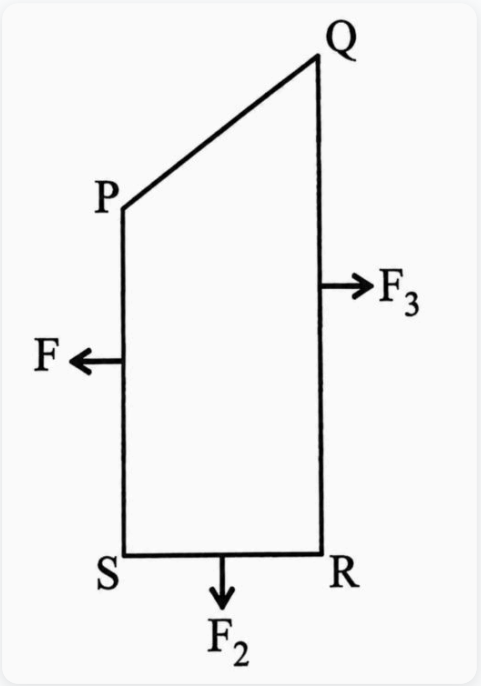
(C) T

(D) 4T

Question 69.

A closed loop PQRS carrying a current is placed in a uniform magnetic field. If the magnetic forces on segments PS, SR, and RQ are F_1, F_2, and F_3 respectively and are in the plane of the paper and along the directions shown, the force on the segment QP is

[4 Marks]



(A) $F_3 - F_1 - F_2$

(B) $\sqrt{(F_3 - F_1)^2 + F_2^2}$

(C) $\sqrt{(F_3 - F_1)^2 - F_2^2}$

(D) $F_3 - F_1 + F_2$

Question 70.

A galvanometer of resistance 50 Ω is connected to battery of 3V along with a resistance of 2950 Ω in series. A full scale deflection of 30 divisions is obtained in the galvanometer. In order to reduce this deflection to 20 divisions, the resistance in series should be

[4 Marks]

(A) 4450 Ω

(B) 5550 Ω

(C) 6050 Ω

(D) 5050 Ω

Question 71.

Curie temperature is the temperature above which

[4 Marks]

(A) ferromagnetic material becomes paramagnetic material

(B) paramagnetic material becomes diamagnetic material

(C) paramagnetic material becomes ferromagnetic material

(D) ferromagnetic material becomes diamagnetic material

Question 72.

A circular disc of radius 0.2 meter is placed in a uniform magnetic field of induction $1/\pi$ (Wb/m^2) in such a way that its axis makes an angle of 60° with □□. The magnetic flux linked with the disc is:

[4 Marks]

(A) 0.01 Wb

(B) 0.08 Wb

(C) 0.06 Wb

(D) 0.02 Wb

Question 73.

A long solenoid has 500 turns. When a current of 2 ampere is passed through it, the resulting magnetic flux linked with each turn of the solenoid is 4×10^{-3} Wb. The self-inductance of the solenoid

is

[4 Marks]

(A) 40 henry

(B) 1.0 henry

(C) 2.0 henry

(D) 2.5 henry

Question 74.

In an a.c. circuit the e.m.f. (e) and the current (i) at any instant are given respectively by

$e = E_0 \sin \omega t$

$i = I_0 \sin (\omega t - \phi)$

The average power in the circuit over one cycle of a.c. is

[4 Marks]

(A) $E_0 I_0$

(B) $(E_0 I_0 / 2) \sin \Phi$

(C) $(E_0 I_0 / 2) \cos \Phi$

(D) $E_0 I_0 / 2$

Question 75.

The velocity of electromagnetic radiation in a medium of permittivity ε_0 and permeability μ_0 is given by

[4 Marks]

(A) $\sqrt{(\mu_0 \varepsilon_0)}$

(B) $\sqrt{(\varepsilon_0 / \mu_0)}$

(C) $1 / \sqrt{(\mu_0 \varepsilon_0)}$

(D) $\sqrt{(\mu_0 / \varepsilon_0)}$

Question 76.

Two thin lenses of focal lengths f_1 and f_2 are in contact and coaxial. The power of the combination is:

[4 Marks]

(A) $f_1 + f_2 / f_1f_2$

(B) $f_1 + f_2 / 2$

(C) $\sqrt{(f_1 / f_2)}$

(D) $\sqrt{(f_2 / f_1)}$

Question 77.

A boy is trying to start a fire by focusing sunlight on a piece of paper using an equiconvex lens of focal length 10 cm. The diameter of the Sun is 1.39 $x10^9$ m and its mean distance from the earth is 1.5 x 10^{11} m. What is the diameter of the Sun's image on the paper?

[4 Marks]

(A) 12.4 x 10^{-4}m

(B) 6.5 x 10^{-5}m

(C) 6.5 $x10^{-4}$m

(D) 9.2 x 10^{-4}m

Question 78.

The periodic waves of intensities I_1 and I_2 pass through a region at the same time in the same direction. The sum of the maximum and minimum intensities is:

[4 Marks]

(A) $(\sqrt{I_1} - \sqrt{I_2})^2$

(B) $(\sqrt{I_1} + \sqrt{I_2})^2$

(C) $I_1 + I_2$

(D) $2(I_1 + I_2)$

Question 79.

In the phenomenon of electric discharge through gases at low pressure, the coloured glow in the tube appears as a result of:

[4 Marks]

(A) collisions between the charged particles emitted from the cathode and the atoms of the gas

(B) collision between different electrons of the atoms of the gas

(C) collision between the atoms of the gas

(D) excitation of electrons in the atoms

Question 80.

A particle of mass 1 mg has the same wavelength as an electron moving with a velocity of 3×10^{6} ms^{-1}. The velocity of the particle is:

[4 Marks]

(A) $9 \times 10^{-2}\ ms^{-1}$

(B) $3 \times 10^{-31}\ ms^{-1}$

(C) $2.7 \times 10^{-21}\ ms^{-1}$

(D) $2.7 \times 10^{-18}\ ms^{-1}$

Question 81.

The work function of a surface of a photosensitive material is 6.2 eV. The wavelength of incident radiation for which the stopping potential is 5 V lies in the:

[4 Marks]

(A) Ultraviolet region

(B) Visible region

(C) Infrared region

(D) X-ray region

Question 82.

The ground state energy of hydrogen atom is 13.6 eV. When its electron is in the first excited state, its excitation energy is

[4 Marks]

(A) 0

(B) 10.2 eV

(C) 6.8 eV

(D) 3.4 eV

Question 83.

Two nuclei have their mass numbers in the ratio of 1 : 3. The ratio of their nuclear densities would be

[4 Marks]

(A) 1 : 3

(B) 3 : 1

(C) $(3)^{1/3}$: 1

(D) 1 : 1

Question 84.

If M(A; Z), M_p, and M_n denote the masses of the nucleus ${}^{A}_{Z}X$, proton and neutron respectively in units of u (1 u = 931.5 MeV/c^2) and BE represents its bonding energy in MeV, then

[4 Marks]

(A) $M(A, Z) = ZM_p + (A - Z)M_n - BE/c^2$

(B) $M(A, Z) = ZM_p + (A - Z)M_n + BE$

(C) $M(A, Z) = ZM_p + (A - Z)M_n + BE/c^2$

(D) $M(A, Z) = ZM_p + (A - Z)M_n - BE$

Question 85.

Two radioactive materials X_1 and X_2 have decay constants 5λ and λ respectively. If initially they have the same number of nuclei, then the ratio of the number of nuclei of X_1 to that of X_2 will be 1 / e after a time

[4 Marks]

(A) e / λ

(B) 1 / 4λ

(C) λ

(D) (1 / 2) λ

Question 86.

A p-n photodiode is made of a material with a band gap of 2.0 eV. The minimum frequency of the radiation that can be absorbed by the material is nearly

[4 Marks]

(A) 20×10^{14} Hz

(B) 1×10^{14} Hz

(C) 5×10^{14} Hz

(D) 10×10^{14} Hz

Question 87.

The voltage gain of an amplifier with 9% negative feedback is 10. The voltage gain without feedback will be

[4 Marks]

(A) 90

(B) 10

(C) 1.25

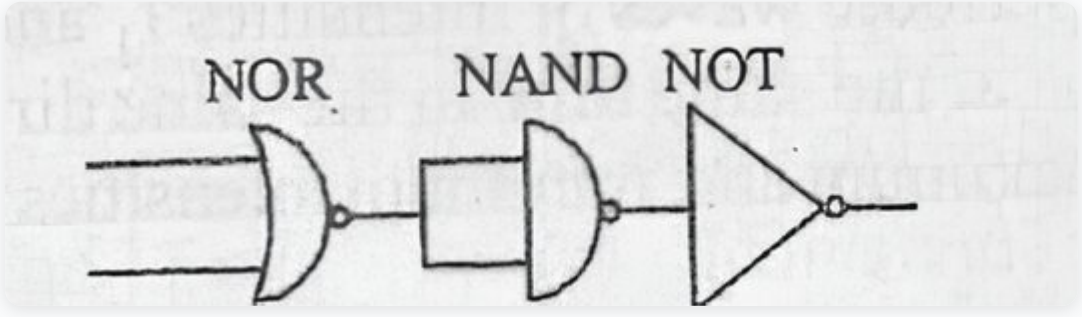
(D) 100

Question 88.

The circuit

is equivalent to

[4 Marks]



(A) AND gate

(B) NAND gate

(C) OR gate

(D) NOR gate

Question 89.

If the lattice parameter for a crystal line structure is 3.6 Å, then the atomic radius in fcc crystal is

[4 Marks]

(A) 1.27 Å

(B) 2.92 Å

(C) 2.10 Å

(D) 1.81 Å

Question 90.

The energy required to charge a parallel plate condenser of plate separation *d* and plate area of cross-section *A* such that the uniform electric field between the plates is E_1, is

[4 Marks]

(A) $(1 / 2)\ \varepsilon_0 E^2\ Ad$

(B) $\varepsilon_0 E^2 / Ad$

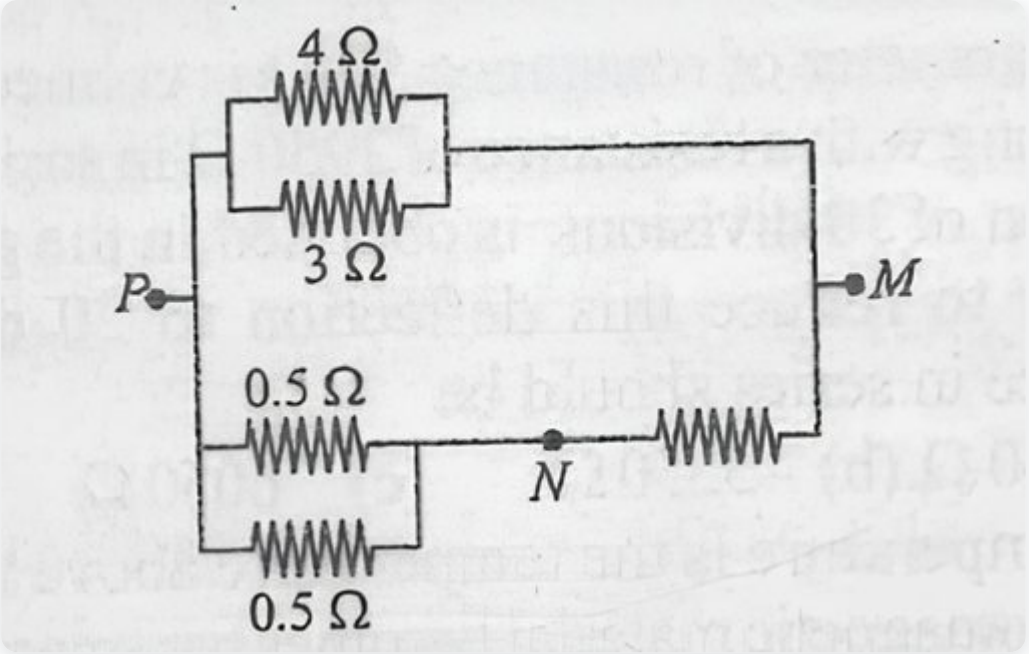
(C) $\varepsilon_0 E^2\ Ad$

(D) $(1 / 2)\ \varepsilon_0 E^2 / Ad$

Question 91.

In the circuit shown, the current through the 4 Ω resistor is 1 A when the points P and M are connected to a DC voltage source. The potential difference between the points M and N is

[4 Marks]



(A) 1.0 V

(B) 1.5 V

(C) 0.5 V

(D) 3.2 V

Question 92.

What volume of oxygen gas (O_2) measured at 0°C and 1 atm, is needed to burn completely 1 L of propane gas (C_3H_8) measured under the same conditions?

[4 Marks]

(A) 5L

(B) 10 L

(C) 7L

(D) 6L

Question 93.

Number of moles of MnO_4^- required to oxidize one mole of ferrous oxalate completely in acidic medium will be:

[4 Marks]

(A) 7.5 moles

(B) 0.2 moles

(C) 0.6 mole

(D) 0.4 moles

Question 94.

Volume occupied by one molecule of water (density = 1 g cm^{-3}) is:

[4 Marks]

(A) 9.0×10^{-23} cm^3

(B) 3.0×10^{-23} cm^3

(C) 6.023×10^{-23} cm^3

(D) 5.5×10^{-23} cm^3

Question 95.

An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gave C, 38.71% and H, 9.67%. The empirical formula of the compound would be:

[4 Marks]

(A) CH_2O

(B) CH_3O

(C) CHO

(D) CH_4O

Question 96.

The measurement of the electron position if associated with an uncertainty in momentum, which is equal to 1×10^{-18} g cm s^{-1}. The uncertainty in electron velocity is, (mass of an electron is 9×10^{-28} g)

[4 Marks]

(A) 1×10^{11} cm s^{-1}

(B) 1×10^{9} cm s^{-1}

(C) 1×10^{5} cm s^{-1}

(D) 1×10^{6} cm s^{-1}

Question 97.

How many moles of lead (II) chloride will be formed from a reaction between 6.5 g of PbO and 3.2 g of HCl?

[4 Marks]

(A) 0.029

(B) 0.011

(C) 0.044

(D) 0.333

Question 98.

If uncertainty in position and momentum are equal, then uncertainty in velocity is:

[4 Marks]

(A) $\sqrt{(h / (2\pi))}$

(B) $(1 / 2m) \sqrt{(h / \pi)}$

(C) $(1 / m) \sqrt{(h / \pi)}$

(D) $\sqrt{(h / \pi)}$

Question 99.

The angular shape of ozone molecule (O_3) consists of:

[4 Marks]

(A) 2 sigma and 2 pi bonds

(B) 1 sigma and 1 pi bonds

(C) 2 sigma and 1 pi bonds

(D) 1 sigma and 2 pi bonds

Question 100.

The correct order of increasing bond angles in the following triatomic species is:

[4 Marks]

(A) $NO_2^+ < NO_2 < NO_2^-$

(B) $NO_2^- < NO_2^+ < NO_2$

(C) $NO_2^- < NO_2 < NO_2^+$

(D) $NO_2^+ < NO_2^- < NO$

Question 101.

Which of the following are not the state functions?

(I) q + w

(II) q

(III) w

(IV) H − TS

[4 Marks]

(A) (I), (II) and (III)

(B) (II) and (III)

(C) (I) and (IV)

(D) (II), (III) and (IV)

Question 102.

Cornea transplant in humans is almost never rejected. This is because

[4 Marks]

(A) it is composed of enucleated cells

(B) it is a non-living layer

(C) it has no blood supply

(D) its cells are least penetrable by bacteria

Question 103.

The blood calcium level is lowered by the deficiency of

[4 Marks]

(A) parathormone

(B) thyroxine

(C) both calcitonin and parathormone

(D) calcitonin

Question 104.

Which one of the following pairs of organs includes only the endocrine glands?

[4 Marks]

(A) Parathyroid and Adrenal

(B) Pancreas and Parathyroid

(C) Thymus and Testes

(D) Adrenal and Ovary

Question 105.

Unisexuality of flowers prevents

[3 Marks]

(A) both geitonogamy and xenogamy

(B) autogamy and geitonogamy

(C) geitonogamy, but not xenogamy

(D) autogamy, but not geitonogamy

Question 106.

What does the filiform apparatus do at the entrance into ovule?

[4 Marks]

(A) It helps in the entry of pollen tube into a synergid

(B) It guides pollen tube from a synergid to egg

(C) It brings about opening of the pollen tube

(D) It prevents entry of more than one pollen tube into the embryo sac

Question 107.

Endosperm is consumed by developing embryo in the seed of

[4 Marks]

(A) maize

(B) pea

(C) castor

(D) coconut

Question 108.

Dry indehiscent single-seeded fruit formed from bicarpellary syncarpous inferior ovary is

[4 Marks]

(A) Berry

(B) Cremocarp

(C) Caryopsis

(D) Cypsela

Question 109.

The fleshy receptacle of syconus of fig encloses a number of:

[4 Marks]

(A) Mericarps

(B) Berries

(C) Samaras

(D) Achenes

Question 110.

The fruit is chambered, developed from inferior ovary and has seeds with succulent testa in

[4 Marks]

(A) guava

(B) cucumber

(C) orange

(D) pomegranate

Question 111.

Which one of the following statements is incorrect about menstruation?

[4 Marks]

(A) The beginning of the cycle of menstruation is called menarche

(B) At menopause in the female, there is especially abrupt increase in gonadotropic hormones

(C) During normal menstruation about 40 ml blood is lost

(D) The menstrual fluid can easily clot

Question 112.

Which extra-embryonic membrane in humans prevents desiccation of the embryo inside the uterus?

[4 Marks]

(A) Chorion

(B) Allantois

(C) Yolk sac

(D) Amnion

Question 113.

Given below are four methods (A-D) and their modes of action (a-d) in achieving contraception. Select their correct matching from the four options that follow:

[4 Marks]

Method	Mode of Action
A. The pill	(a) Prevents sperms reaching cervix
B. Condom	(b) Prevents implantation
C. Vasectomy	(c) Prevents ovulation
D. Copper T	(d) Semen contains no sperms

(A) A -(b), B-(c), C-(a), D-(d)

(B) A -(d), B-(a), C-(b), D-(c)

(C) A -(c), B-(d), C-(a), D-(b)

(D) A -(c), B-(a), C-(d), D-(b)

Question 114.

Consider the statements given below regarding contraception and answer as directed thereafter

(i) Medical Termination of Pregnancy (MTP) during first trimester is generally safe

(ii) Generally chances of conception are nil until mother 'breast-feeds the infant upto two years

(iii) Intrauterine devices like copper-T are effective contraceptives

(iv) Contraception pills may be taken upto one week after coitus to prevent conception

Which two of the above statements are correct?

[4 Marks]

(A) iii and iv

(B) ii and iii

(C) i and ii

(D) i and iii

Question 115.

Which one of the following conditions in humans is correctly matched with its chromosomal abnormality/linkage?

[4 Marks]

(A) Downs syndrome – 44 autosomes + XO

(B) Erythroblastosis foetalis – X-linked

(C) Klinefelter's syndrome – 44 autosomes + XXY

(D) Colour blindness – Y-linked

Question 116.

Haploids are more suitable for mutation studies than the diploids. This is because

[4 Marks]

(A) haploids are reproductively more stable than diploids

(B) mutagens penetrate in haploids more effectively than diploids

(C) haploids are more abundant in nature than diploids

(D) all mutations, whether dominant or recessive are expressed in haploids

Question 117.

Which one of the following pairs of nitrogenous bases of nucleic acids, is wrongly matched with the category mentioned against it?

[4 Marks]

(A) Uracil, Cytosine – Pyrimidines

(B) Thymine, Uracil – Pyrimidines

(C) Adenine, Thymine – Purines

(D) Guanine, Adenine – Purines

Question 118.

Which one of the following pairs of codons is correctly matched with their function or the signal for the particular amino acid?

[4 Marks]

(A) UUA, UCA – Leucine

(B) AUG, ACG – Start/Methionine

(C) UAG, UGA – Stop

(D) GUU, GCU – Alanine

Question 119.

Polysome is formed by

[4 Marks]

(A) a ribosome with several subunits

(B) ribosomes attached to each other in a linear arrangement

(C) several ribosomes attached to a single mRNA

(D) many ribosomes attached to a strand of endoplasmic reticulum

Question 120.

In the DNA molecule

[4 Marks]

(A) there are two strands which run parallel in the 5′ → 3′ direction

(B) the proportion of Adenine in relation to thymine varies with the organism

(C) there are two strands which run anti-parallel, one in 5′ → 3′ direction and other in 3′ → 5′

(D) the total amount of purine nucleotides and pyrimidine nucleotides is not always equal

Question 121.

Which one of the following scientists name is correctly matched with the theory put forth by him?

[4 Marks]

(A) Pasteur – Inheritance of acquired characters

(B) Weismann – Theory of continuity of Germplasm

(C) De Vries – Natural selection

(D) Mendel – Theory of Pangenesis

Question 122.

Darwinism finches are an excellent example of

[4 Marks]

(A) connecting links

(B) brood parasitism

(C) seasonal migration

(D) adaptive radiation

Question 123.

Thorn of Bougainvillea and tendril of Cucurbita are example of

[4 Marks]

(A) analogous organs

(B) homologous organs

(C) vestigial organs

(D) retrogressive evolution

Question 124.

Which one of the following pairs of items correctly belongs to the category of organs mentioned against it?

[4 Marks]

(A) Wings of honey bee and wings of crow – Homologous organs

(B) Nephridia of earthworm and malpighian tubules of Cockroach – Excretory organs

(C) Nictitating membrane and blind spot in human eye – Vestigial organs

(D) Thorn of Bougainvillea and tendril of Cucurbita – Analogous organs

Question 125.

Which one of the following is incorrect about the characteristics of protobionts (coacervates and microspheres) as envisaged in the biogenic origin of life?

[4 Marks]

(A) They were able to reproduce

(B) They could separate combinations of molecules from the surroundings

(C) They could maintain an internal environment

(D) They were partially isolated from the surroundings

Question 126.

Match the disease in Column I with the appropriate items (pathogen/prevention/treatment) in Column II.

[4 Marks]

Column I	Column II
1. Amoebiasis	(i) Treponema pallidum
2. Diphtheria	(ii) Use only sterilized food and water
3. Cholera	(iii) DPT Vaccine
4. Syphilis	(iv) Use oral rehydration therapy

(A) (1) – (i), (2) – (ii), (3) – (iii), (4) – (iv)

(B) (1) – (ii), (2) – (iv), (3) – (i), (4) – (iii)

(C) (1) – (ii), (2) – (i), (3) – (iii), (4) – (iv)

(D) (1) – (ii), (2) – (iii), (3) – (iv), (4) – (i)

Question 127.

To which type of barriers under innate immunity, do the saliva in the mouth and the tears from the eyes, belong?

[4 Marks]

(A) Cytokine barriers

(B) Cellular barriers

(C) Physiological barriers

(D) Physical barriers

Question 128.

Which one of the following is the correct statement regarding the particular psychotropic drug specified?

[4 Marks]

(A) Opium stimulates nervous system and causes hallucinations

(B) Hashish causes after thought perceptions and hallucinations

(C) Morphine leads to delusions and disturbed emotions

(D) Barbiturates cause relaxation and temporary euphoria

Question 129.

Which one of the following is being tried in India as a biofuel substitute for fossil fuels?

[4 Marks]

(A) Aegilops

(B) Musa

(C) Azadirachta

(D) Jatropha

Question 130.

Consider the following four measures (a–d) that could be taken to successfully grow chickpea in an area where bacterial blight disease is common

(1) Spray with Bordeaux mixture

(2) Control of the insect vector of the disease pathogen

(3) Use of only disease-free seeds

(4) Use of varieties resistant to the disease

Which two of the above measures can control the disease?

[4 Marks]

(A) 1 and 4

(B) 2 and 3

(C) 1 and 2

(D) 3 and 4

Question 131.

Which one of the following proved effective for biological control of nematodal disease in plants?

[4 Marks]

(A) Gliocladium virens

(B) Pseudomonas cepacia

(C) Pisolithus tinctorius

(D) Paecilomyces lilacinus

Question 132.

Trichoderma harzianum has proved a useful microorganism for

[4 Marks]

(A) reclamation of wastelands

(B) gene transfer in higher plants

(C) biological control of soil-borne plant pathogens

(D) bioremediation of contaminated soils

Question 133.

Modern detergents contain enzyme preparations of:

[4 Marks]

(A) Acidophiles

(B) Alkaliphiles

(C) Thermoacidophiles

(D) Thermophiles

Question 134.

Human insulin is being commercially produced from a transgenic species of

[4 Marks]

(A) Escherichia

(B) Mycobacterium

(C) Saccharomyces

(D) Rhizobium

Question 135.

Which one of the following is linked to the discovery of Bordeaux mixture as a popular fungicide?

[4 Marks]

(A) Black rust of wheat

(B) Loose smut of wheat

(C) Downy mildew of grapes

(D) Bacterial leaf blight of rice

Question 136.

The linking of antibiotic resistance gene with the plasmid vector became possible with

[4 Marks]

(A) DNA polymerase

(B) Endonucleases

(C) DNA ligase

(D) Exonucleases

Question 137.

Gel electrophoresis is used for

[4 Marks]

(A) isolation of DNA molecule

(B) construction of recombinant DNA by joining with cloning vectors

(C) cutting of DNA into fragments

(D) separation of DNA fragments according to their size

Question 138.

What is antisense technology?

[4 Marks]

(A) RNA polymerase producing DNA

(B) When a piece of RNA that is complementary in sequence is used to stop expression of a specific gene

(C) Production of somaclonal variants in tissue cultures

(D) A cell displaying a foreign antigen used for synthesis of antigens

Question 139.

Cry endotoxins obtained from Bacillus thuringiensis are effective against

[4 Marks]

(A) nematodes

(B) boll worms

(C) flies

(D) mosquitoes

Question 140.

Consider the following statements about biomedical technologies?

1. During open heart surgery blood is circulated in the heart-lung machine
2. Blockage in coronary arteries is removed by angiography
3. Computerised axial tomography (CAT) shows detailed internal structure as seen in a section of body
4. X-ray provides clear and detailed images of organs like prostate glands and lungs Which two of the above statements are correct?

[4 Marks]

(A) 3 and 4

(B) 2 and 4

(C) 1 and 2

(D) 1 and 3

Question 141.

A transgenic food crop which may help in solving the problem of night blindness in developing countries is

[4 Marks]

(A) Bt Soybean

(B) Golden rice

(C) Starlink maize

(D) Flavr Savr tomatoes

Question 142.

Consider the following four statements (a–d) about certain desert animals such as kangaroo rat.

1. They have dark colour and high rate of reproduction and excrete solid urine
2. They do not drink water, breathe at a slow rate to conserve water and have their body covered with thick hairs
3. They feed on dry seeds and do not require drinking water
4. They excrete very concentrated urine and do not use water to regulate body temperature

Which two of the above statements for such animals are true?

[4 Marks]

(A) 2 and 3

(B) 3 and 4

(C) 1 and 2

(D) 3 and 1

Question 143.

What is true about the isolated small tribal populations?

[4 Marks]

(A) There is a decline in population as boys marry girls only from their own tribe.

(B) Hereditary diseases like colour blindness do not spread in the isolated population.

(C) Wrestlers who develop strong body muscles in their lifetime pass this character on to their progeny.

(D) There is no change in population size as they have a large gene pool.

Question 144.

About 70% of total global carbon is found in

[4 Marks]

(A) agroecosystems

(B) grasslands

(C) oceans

(D) forests

Question 145.

The slow rate of decomposition of fallen logs in nature is due to their

[4 Marks]

(A) low moisture content

(B) anaerobic environment around them

(C) low cellulose content

(D) poor nitrogen content

Question 146.

Consider the following statements concerning food chains

1. removal of 80% tigers from an area resulted in greatly increased growth of vegetation
2. removal of most of the carnivores resulted in an increased population of deers
3. the length of food chains is generally limited to 3–4 trophic levels due to energy loss
4. the length of food chains may vary from 2 to 8 trophic levels

Which two of the above statements are correct?

[4 Marks]

(A) (3) and (4)

(B) (1) and (4)

(C) (2) and (3)

(D) (1) and (2)

Question 147.

The table below gives the population (in thousands) of ten species (A–J) in four areas (a–d) consisting of the number of habitats given within brackets against each. Study the table and answer the question which follows:

Which area out of a to d shows maximum species diversity?

[4 Marks]

Area and Number of habitats	Species and their populations (in thousands) in the									
	A	B	C	D	E	F	G	H	I	J
a (11)	2.3	1.2	0.52	6.0	_	3.1	1.1	9.0	_	10.3
b (11)	10.2	_	0.62	_	1.5	3.0	_	8.2	1.1	11.2
c (13)	11.3	0.9	0.48	2.4	1.4	42	0.8	8.4	2.2	4.1
d (12)	3.2	10.2	11.1	4.8	0.4	33	0.8	7.3	113	2.1

(A) a

(B) d

(C) c

(D) b

Question 148.

Quercus species are the dominant component in

[4 Marks]

(A) Alpine forests

(B) Tropical rain forests

(C) Scrub forests

(D) Temperate deciduous forests

Question 149.

Which one of the following is not observed in biodiversity hotspots?

[4 Marks]

(A) Accelerated species loss

(B) Species richness

(C) Lesser inter-specific competition

(D) Endemism

Question 150.

World Summit on Sustainable Development (2002) was held in

[4 Marks]

(A) South Africa

(B) Argentina

(C) Sweden

(D) Brazil

Question 151.

According to Central Pollution Control Board (CPCB), which particulate size in diameter (in micrometers) of the air pollutants is responsible for greatest harm to human health?

[4 Marks]

(A) 1.0 or less

(B) 5.2 – 2.5

(C) 2.5 or less

(D) 1.5 or less

Question 152.

A lake near a village suffered heavy mortality of fishes within a few days. Consider the following reasons for this?

1. Lots of urea and phosphate fertilizer were used in the crops in the vicinity
2. The area was sprayed with DDT by an aircraft
3. The lake water turned green and stinky
4. Phytoplankton populations in the lake declined initially thereby greatly reducing photosynthesis.

Which two of the above were the main causes of fish mortality in the lake ?

[4 Marks]

(A) (1) and (3)

(B) (3) and (4)

(C) (1) and (2)

(D) (1) and (4)

Question 153.

Which one of the following is the correct percentage of the two (out of the total of 4) green house gases that contribute to the total global warming?

[4 Marks]

(A) CFCs 14%, Methane 20%

(B) CO_2 40%, CFCs 30%

(C) N_2O 6%, CO_2 86%

(D) Methane 20%, N_2O 18%

Question 154.

In human adult females oxytocin:

[4 Marks]

(A) stimulates pituitary to secrete vasopressin

(B) is secreted by anterior pituitary

(C) causes strong uterine contractions during parturition

(D) stimulates growth of mammary glands

Question 155.

What is vital capacity of our lungs?

[4 Marks]

(A) Total lung capacity minus expiratory reserve volume

(B) Total lung capacity minus residual volume

(C) Inspiratory reserve volume plus expiratory reserve volume

(D) Inspiratory reserve volume plus tidal volume

Question 156.

The C4 plants are photosynthetically more efficient than C3 plants because:

[4 Marks]

(A) CO_2 generated during photorespiration is trapped and recycled through PEP carboxylase

(B) the CO_2 compensation point is more

(C) the CO_2 efflux is not prevented

(D) they have more chloroplasts

Question 157.

Which one of the following is incorrect about the characteristics of protobionts (coacervates and microspheres) as envisaged in the abiogenicorigin of life?

[4 Marks]

(A) They could separate combinations of molecules from the surroundings

(B) They were able to reproduce

(C) They were partially isolated from the surruounding

(D) They could maintain an internal environment

Question 158.

Bacterial leaf blight of rice is caused by aspecies of:

[4 Marks]

(A) Pseudomonas

(B) Xanthomonas

(C) Alternaria

(D) Erwinia

Question 159.

If a gas expands at constant temperature, it indicates that:

[4 Marks]

(A) number of the molecules of gas increases

(B) kinetic energy of molecules remains the same

(C) pressure of the gas increases

(D) kinetic energy of molecules decreases

Question 160.

Bond dissociation enthalpy of H_2, Cl_2 and HCl are 434, 242 and 431 kJ mol^{-1} respectively. Enthalpy of formation of HCl is:

[4 Marks]

(A) 245 kJ mol^{-1}

(B) –93 kJ mol^{-1}

(C) –245 kJ mol^{-1}

(D) 93 kJ mol^{-1}

Question 161.

For the gas phase reaction,

$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

which of the following conditions are correct?

[4 Marks]

(A) $\Delta H < 0$ and $\Delta S < 0$

(B) $\Delta H = 0$ and $\Delta S < 0$

(C) $\Delta H > 0$ and $\Delta S < 0$

(D) $\Delta H > 0$ and $\Delta S > 0$

Question 162.

If the concentration of OH^- ions in the reaction

$Fe(OH)_3(s) \rightleftharpoons Fe^{3+}(aq) + 3OH^-(aq)$

is decreased by 1/4 times, then equilibrium concentration of Fe^{3+} will increase by:

[4 Marks]

(A) 16 times

(B) 4 times

(C) 8 times

(D) 64 times

Question 163.

The dissociation equilibrium of a gas AB_2 can be represented as

$2AB_2(g) \rightleftharpoons 2AB(g) + B_2(g)$

The degree of dissociation is 'x' and is small compared to 1. The expression relating the degree of dissociation (x) with equilibrium constant K_p and total pressure P is:

[4 Marks]

(A) (K_p / P)

(B) $(2K_p / P)^{1/3}$

(C) $(2K_p / P)^{1/2}$

(D) $(2K_p / P)$

Question 164.

The values of Kp_1 and Kp_2 for the reactions:

$X \rightleftharpoons Y + Z$ ...(a)

$A \rightleftharpoons 2B$ ...(b)

are in the ratio of 9 : 1. If degree of dissociation of X and A be equal, then total pressure at equilibrium for (a) and (b) are in the ratio:

[4 Marks]

(A) 1 : 9

(B) 36 : 1

(C) 1 : 1

(D) 3 : 1

Question 165.

Equal volumes of three acid solutions of pH3, 4, and 5 are mixed in a vessel. What will be the H^+ ion concentration in the mixture?

[4 Marks]

(A) 3.7×10^{-4} M

(B) 1.11×10^{-4} M

(C) 3.7×10^{-3} M

(D) 1.11×10^{-3} M`

Question 166.

The value of equilibrium constant of the reaction

$HI(g) \rightleftharpoons (1 / 2)\ H_2(g) + (1 / 2)\ I_2(g)$ is 8.0.

The equilibrium constant of the reaction

$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ will be:

[4 Marks]

(A) 1 / 16

(B) 16

(C) 1 / 8

(D) 1 / 64

Question 167.

Equimolar solutions of the following were prepared in water separately. Which one of the solutions will record the highest pH?

[4 Marks]

(A) $CaCl_2$

(B) $MgCl_2$

(C) $BaCl_2$

(D) $SrCl_2$

Question 168.

The sequence of ionic mobility in aqueous solution is:

[4 Marks]

(A) $Na^+ > K^+ > Rb^+ > Cs^+$

(B) $Rb^+ > K^+ > Cs^+ > Na^+$

(C) $K^+ > Na^+ > Rb^+ > Cs^+$

(D) $Cs^+ > Rb^+ > K^+ > Na^+$

Question 169.

The alkali metals form salt-like hydrides by the direct synthesis at elevated temperature. The thermal stability of these hydrides decreases in which of the following orders?

[4 Marks]

(A) LiH > NaH > KH > RbH > CsH

(B) NaH > LiH > KH > RbH > CsH

(C) KH > NaH > LiH > CsH > RbH

(D) CsH > RbH > KH > NaH > LiH

Question 170.

In the hydrocarbon

$CH_3 - CH = CH - CH_2 - C \equiv CH$

6 5 4 3 2 1

The state of hybridization of carbons 1, 3, and 5 are in the following sequence:

[4 Marks]

(A) sp, sp^3, sp^2

(B) sp^2, sp, sp^3

(C) sp, sp^2, sp^3

(D) sp^3, sp^2, sp

Question 171.

[4 Marks]

Base strength of :

(A) $H_3C-\bar{C}H_2$ (B) $H_2C=\bar{C}H$ and

(C) $H-C\equiv\bar{C}$

is in the order of :

(A) (C) > (B) > (A)

(B) (B) > (A) > (C)

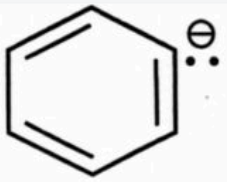
(C) (A) > (C) > (B)

(D) (A) > (B) > (C)

Question 172.

The stability of carbanions in the following:

[4 Marks]

(a) $RC\equiv\bar{C}$ (b) 

(c) $R_2C=C\bar{H}$ (d) $R_3C-C\bar{H}_2$

is in the order of :

(A) (a) > (b) > (c) > (d)

(B) (b) > (c) > (d) > (a)

(C) (d) > (b) > (c) > (a)

(D) (a) > (c) > (b) > (d)

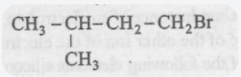
Question 173.

[4 Marks]

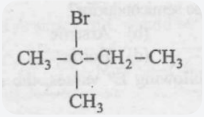
$$H_3C - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH = CH_2 + HBr \longrightarrow A$$

A (predominantly) is :

(A)



(B)



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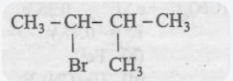

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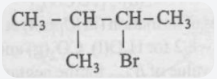
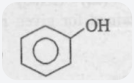


Question 174.

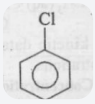
Which one of the following is most reactive towards electrophilic attack ?

[4 Marks]

(A)



(B)



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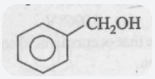

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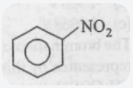


Question 175.

Green chemistry means such reactions which

[4 Marks]

(A) are related to the depletion of ozone layer

(B) study the reactions in plants

(C) reduce the use and production of hazardous chemicals

(D) produce colour during reactions

Question 176.

Percentage of free space in a body centred cubic unit cell is:

[4 Marks]

(A) 34%

(B) 28%

(C) 30%

(D) 32%

Question 177.

If ‘a’ stands for the edge length of the cubic systems:

simple cubic, body centred cubic and face centred cubic, then the ratio of radii of the spheres in these systems will be respectively,

[4 Marks]

(A) a : √3a :√2a

(B) (1 / 2)a : √3a : (1 / √2)a

(C) (1 / 2)a : (√3 / 2)a : (√3 / 2)a

(D) (1 / 2)a : (√3 / 4)a : (1 / 2√2)a

Question 178.

Kohlrausch's law states that at:

[4 Marks]

(A) infinite dilution, each ion makes definite contribution to conductance of an electrolyte whatever be the nature of the other ion of the electrolyte.

(B) infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte.

(C) finite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte.

(D) infinite dilution each ion makes definite contribution to equivalent conductance of an electrolyte depending on the nature of the other ion of the electrolyte.

Question 179.

With which one of the following elements silicon should be doped so as to give p-type semiconductor?

[4 Marks]

(A) Selenium

(B) Boron

(C) Arsenic

(D) Germanium

Question 180.

On the basis of the following E° values, the strongest oxidizing agent is:

$[Fe(CN)_6]^{4-} \rightarrow [Fe(CN)_6]^{3-} + e^-$; $E° = -0.35$ V

$Fe^{2+} \rightarrow Fe^{3+} + e^-$ $E° = -0.77$ V

[4 Marks]

(A) Fe^{2+}

(B) $[Fe(CN)_6]^{4-}$

(C) Fe^{3+}

(D) $[Fe(CN)_6]^{3-}$

Question 181.

Standard free energies of formation (in kJ/mol) at 298 K are –237.2, –394.4 and –8.2 for $H_2O(l)$, $CO_2(g)$ and pentane (g), respectively. The value of E°_cell for the pentane–oxygen fuel cell is:

[4 Marks]

(A) 0.0968 V

(B) 1.0968 V

(C) 1.968 V

(D) 2.0968 V

Question 182.

The bromination of acetone that occurs in acid solution is represented by this equation:

$CH_3COCH_3(aq) + Br_2(aq) \rightarrow CH_3COCH_2Br(aq) + H^+(aq) + Br^-(aq)$

These kinetic data were obtained for given reaction concentrations.

[4 Marks]

Initial Concentrations, M		
$[CH_3COCH_3]$	$[Br_2]$	$[H^+]$
0.30	0.05	0.05
0.30	0.10	0.05
0.30	0.10	0.10
0.40	0.05	0.20

Initial rate, disappearance of Br_2, Ms^{-1}

5.7×10^{-5} 5.7×10^{-5}

1.2×10^{-4} 3.1×10^{-4}

Base on these data, the rate equations is:

(A) Rate = $k[CH_3COCH_3][Br_2][H^+]$

(B) Rate = $k[CH_3COCH_3][Br_2][H^+]^2$

(C) Rate = $k[CH =COCH_3][Br_2]$

(D) Rate = $k[CH_3COCH_3][H^+]$

Question 183.

The rate constants k_1 and k_2 for two different reactions are 10^{16}. e_(-2000/T) and 10^{15}.e_(-1000/T), respectively. The temperature at which $k_1 = k_2$ is:

[4 Marks]

(A) (2000 / 2.303) K

(B) (1000 / 2.303) K

(C) 1000 K

(D) 2000 K

Question 184.

The correct order of decreasing second ionisation enthalpy of Ti (22), V (23), Cr (24) and Mn (25) is:

[4 Marks]

(A) V > Mn > Cr > Ti

(B) Mn > Cr > Ti > V

(C) Ti > V > Cr > Mn

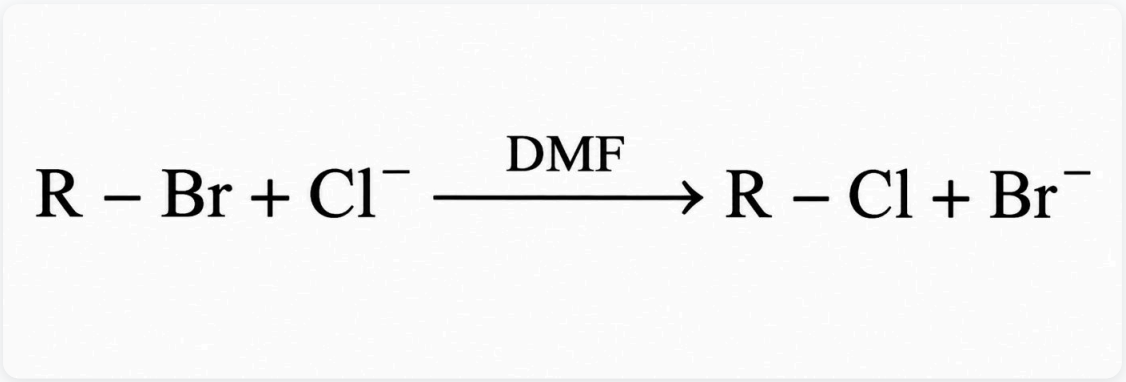
(D) Cr > Mn > V > Ti

Question 185.

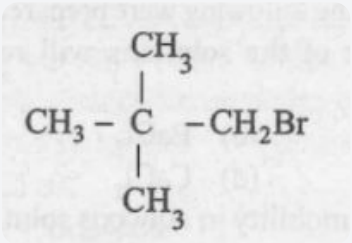
In an S_N2 substitution reaction of the type

which one of the following has the highest reactivity rate?

[4 Marks]



(A)



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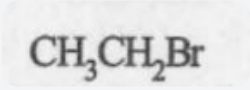

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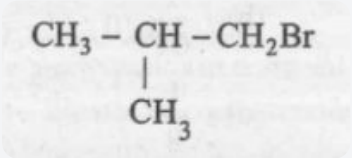

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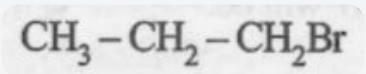


Question 186.

How many stereoisomers does this molecule have?

$CH_3CH = CHCH_2CHBrCH_3$

[4 Marks]

(A) 4

(B) 2

(C) 6

(D) 8

Question 187.

A strong base can abstract an α-hydrogen from:

[4 Marks]

(A) alkene

(B) amine

(C) alkane

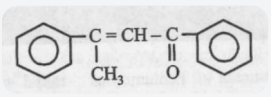
(D) ketone

Question 188.

Acetophenone when reacted with a base, C_2H_5ONa, yields a stable compound which has the structure.

[4 Marks]

(A)



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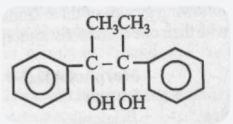

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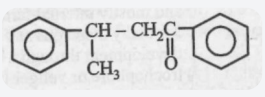

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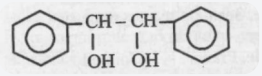


Question 189.

The relative reactivities of acyl compounds towards nucleophilic substitution are in the order of:

[4 Marks]

(A) Acyl chloride > Acid anhydride > Ester > Amide

(B) Acid anhydride > Amide > Ester > Acyl chloride

(C) Ester > Acyl chloride > Amide > Acid anhydride

(D) Acyl chloride > Ester > Acid anhydride > Amide

Question 190.

Which one of the following is an amine hormone?

[4 Marks]

(A) Insulin

(B) Progesterone

(C) Oxypurin

(D) Thyroxine

Question 191.

Which one of the following statement is not true?

[4 Marks]

(A) Buna-S is a copolymer of butadiene and styrene

(B) Natural rubber is a 1,4-polymer of isoprene

(C) Natural rubber has the trans-configuration at every double bond

(D) In vulcanization the formation of sulphur bridges between different chains make rubber harder and stronger.

Question 192.

Which of the following complexes exhibits the highest paramagnetic behaviour?

where gly = glycine, en = ethylenediamine and bpy = bipyridyl moieties

(At.nos Ti = 22, V = 23, Fe = 26, Co = 27)

[4 Marks]

(A) $[V(gly)_2(OH)_2(NH_3)_2]^+$

(B) $[Fe(en)(bpy)(NH_3)_2]^{2+}$

(C) $[Ti(NH_3)_6]^{3+}$

(D) $[Co(ox)_2(OH)_2]^-$

Question 193.

In which of the following coordination entities the magnitude Δ_0 (CFSE in octahedral field) will be maximum?

(At. No. Co = 27)

[4 Marks]

(A) $[Co(CN)_6]^{3-}$

(B) $[Co(C_2O_4)_3]^{3-}$

(C) $[Co(NH_3)_6]^{3+}$

(D) $[Co(H_2O)_6]^{3+}$

Question 194.

Which of the following statements is not correct?

[4 Marks]

(A) The number of carbon atoms in an unit cell of diamond is 4

(B) Molecular solids are generally volatile

(C) The fraction of the total volume occupied by the atoms in a primitive cell is 0.48

(D) The number of Bravais lattices in which a crystal can be categorized is 14

Question 195.

Four diatomic species are listed below the different sequences. Which of these presents the correct order of their increasing bond order?

[4 Marks]

(A) NO < C_2^{2-} < O_2^- < $He2^+$

(B) C_2^{2-} < He_2^+ < NO < O_2^-

(C) O_2^- < NO < O_2^{2-} < He_2^+

(D) He_2^+ < O_2^- < NO < C_2^{2-}

Question 196.

In DNA, the complimentary bases are

[4 Marks]

(A) Adenine and thymine, guanine and cytosine

(B) Adenine and guanine, thymine and cytosine

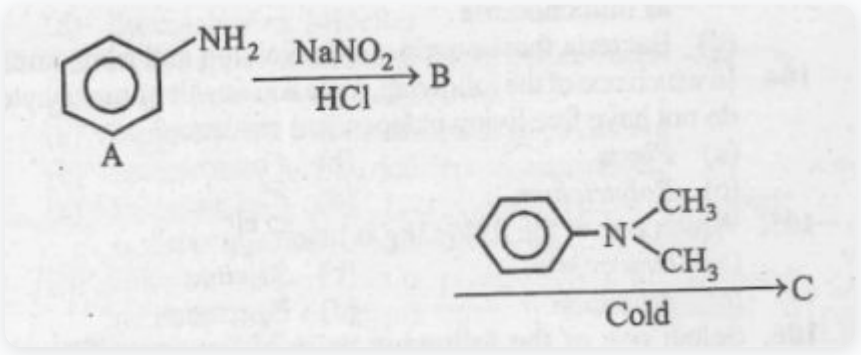
(C) Adenine and thymine, guanine and uracil

(D) Uracil and adenine, cytosine and guanine

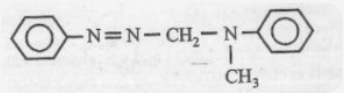
Question 197.

In a reaction of aniline a coloured product C was obtained The structure of C would be

[4 Marks]



(A)



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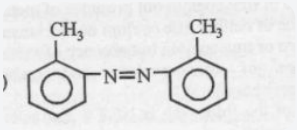

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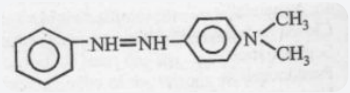

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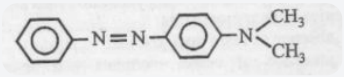

Question 198.

Which one of the following proved effective for biological control of nematodal disease in plants?

[4 Marks]

(A) Pisolithus tinctorius

(B) Pseudomonas cepacia

(C) Gliocladium virens

(D) Paecilomyces lilacinus

Question 199.

Trichoderma harzianum has proved a useful microorgan-ism for

[4 Marks]

(A) reclamation of wastelands

(B) bioremediation of contaminated soils

(C) gene transfer in higher plants

(D) biological control of soil-borne plant pathogens

Question 200.

Modern detergents contain enzyme preparations of:

[4 Marks]

(A) Alkaliphiles

(B) Acidophiles

(C) Thermoacidophiles

(D) Thermophiles