NEET 2020
FULL TEST-8

CHEMISTRY , PHYSICS, BIOLOGY

Time : - 3 Hours   **Max. Marks:- 720**   **Date : ....**

INSTRUCTIONS :

1. The test is of 3 hours duration.

2. The Test Booklet consists of 180 questions. The maximum marks are 720.

3. There are three parts in the question paper A, B, C consisting of Chemistry, Physics having 45 questions each and Biology having 90 questions of equal weightage. Each question is allotted 4 (four) marks for each correct response. ¼ (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.

4. There is only one correct response for each question. Filling upmore than one response in each question will be treated as wrong response and marks for wrong response will be deducted accordingly.

PART A – CHEMISTRY

Q.1 A balloon occupies a volume of 1.0 liter when it contains 0.16 grams of helium at 37°C and 1 atm pressure. If helium is added to the balloon until it contains 0.80 grams while pressure and temperature are kept constant, what will be the new volume of the balloon?
(1) 0.50 liters   (2) 1.0 liters
(3) 2.0 liters   (4) 5.0 liters

Q.2 $2S(s) + 3 O_2(g) \rightarrow 2 SO_3(g)$
$\Delta H = +800$ kJ / mol
$2 SO_3(g) \rightarrow 2 SO_2(g) + O_2(g)$
$\Delta H = -200$ kJ / mol
Based on the information given above, what is ΔH for the following reaction?
$$S(s) + O_2(g) \rightarrow SO_2(g)$$
(1) 300 kJ   (2) 500 kJ
(3) 600 kJ   (4) 1,000 kJ

Q.3 When benzene and toluene are mixed together, they form an ideal solution. If benzene has a higher vapour pressure than toluene, then the vapour pressure of a solution that contains an equal number of moles of benzene and toluene will be
(1) higher than the vapour pressure of benzene.
(2) equal to the vapour pressure of benzene.
(3) lower than the vapour pressure of benzene and higher than the vapour pressure of toluene.
(4) equal to the vapour pressure of toluene.

Q.4 $H_2(g) + CO_2(g) \rightleftharpoons H_2O(g) + CO(g)$
Initially, a sealed vessel contained only $H_2(g)$ with a partial pressure of 6 atm and $CO_2(g)$ with a partial pressure of 4 atm. The reaction above was allowed to come to equilibrium at a temperature of 700 K. At equilibrium, the partial pressure due to CO (g) was found to be 2 atm. What is the value of the equilibrium constant K_p, for the reaction?
(1) 1/24   (2) 1/6
(3) 1/4   (4) 1/2

Q.5 $H_2(g) + I_2(g) \rightarrow 2 HI(g)$
When the reaction given above takes place in a sealed isothermal container, the rate law is
$$Rate = k [H_2] [I_2]$$

If a mole of H_2 gas is added to the reaction chamber, which of the following will be true?
(1) The rate of reaction and the rate constant will increase.
(2) The rate of reaction and the rate constant will not change.
(3) The rate of reaction will increase and the rate constant will decrease.
(4) The rate of reaction will increase and the rate constant will not change.

Q.6 Elements of which group form anions most readily:
(1) Oxygen family   (2) Nitrogen group
(3) Halogens   (4) Alkali metals

Q.7 Which statement is correct :
(1) All the compounds having polar bonds, have dipole moment.
(2) SO_2 is non-polar.
(3) H_2O molecule is non polar, having polar bonds
(4) PH_3 is polar molecule having non polar bonds

Q.8 Correct order of volatility is :
(1) HF > HCl > HBr > HI
(2) HCl > HBr > HI > HF
(3) HI > HBr > HCl > HF
(4) HBr < HCl < HI < HF

Q.9 The dipole moment of H_2O_2 is 2.1 D. This indicates that the structure of H_2O_2 is :
(1) Linear   (2) Non-linear
(3) Symmetrical   (4) None

Q.10 Consider the oxy acids $HClO_n$ series, here value of n is 1 to 4. Then incorrect statement regarding these oxy acids is
(1) acidic character of oxy acids increases with increasing value of n.
(2) oxidising power of oxy acids increases with decreasing value of n.
(3) thermal stability of oxy acids decreases with increasing value of n.
(4) Cl–O bond order decreases with decreasing value of n.

Q.11 Ammonia can be dried by –
(1) Conc. H_2SO_4 (2) P_4O_{10}
(3) CaO   (4) Anhydrous $CaCl_2$

SPACE FOR ROUGH WORK

Q.12 Which of the following product is not formed by the reaction of PH_4I and KOH :
(1) KI
(2) PH_3
(3) H_2O
(4) P_2O_3

Q.13 Which of the following will be true when a pure substance in liquid phase freezes spontaneously?
(1) ΔG, ΔH, and ΔS are all positive.
(2) ΔG, ΔH, and ΔS are all negative.
(3) ΔG and ΔH are negative, but ΔS is positive.
(4) ΔG and ΔS are negative, but ΔH is positive.

**Q.14** What is the correct IUPAC name for the compound
shown:
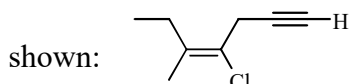
(1) E-4-chloro-3-methyl-3-hepten-6-yne
(2) E-4-chloro-5-methyl-4-hepten-1-yne
(3) Z-4-chloro-3-methyl-3-hepten-6-yne
(4) Z-4-chloro-5-methyl-4-hepten-1-yne

Q.15 What is the product of the reaction of an alkene with potassium permanganate $(KMnO_4)$?
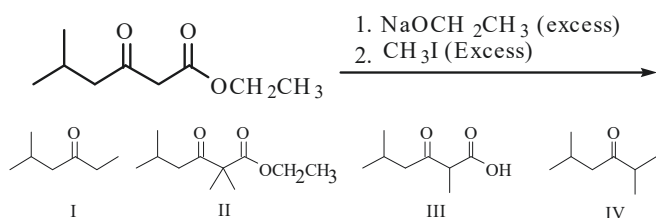(1) An anti diol
(2) An alcohol
(3) A syn diol
(4) A cis dihalide

Q.16 Predict the correct product(s) for the reaction shown:
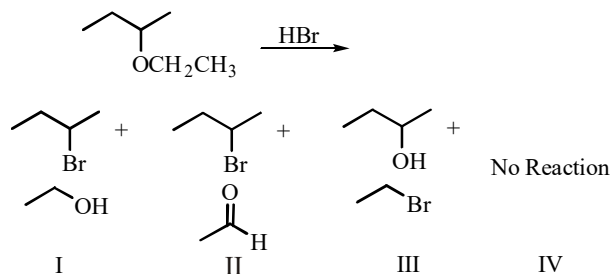
(1) I
(2) II
(3) III
(4) IV

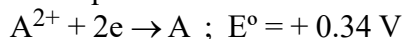**Q.17** What is the product of the reaction shown?

(1) I
(2) II
(3) III
(4) IV

Q.18 Which statement about the Wittig reaction is incorrect?
(1) The Wittig reaction is a method for converting aldehydes and ketones into alkenes.
(2) Phosphonium ylides act as the nucleophile in the reaction.
(3) The precursor to a phosphonium ylide is formed from the S_N1 attack of phosphorus on an alkyl halide so using secondary and tertiary alkyl halides is best.
(4) Once the phosphorus has attacked the halide, a strong base like butyl lithium is used to deprotonate the carbon bonded to the phosphorus resulting in the formation of the phosphonium ylide.
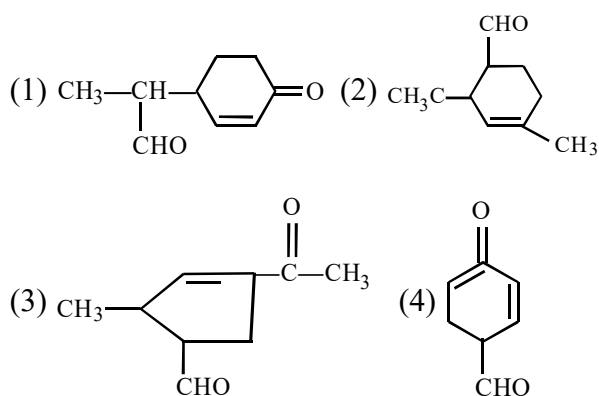
Q.19 Cell equation : $A + 2B^+ \rightarrow A^{2+} + 2B$
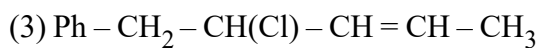$A^{2+} + 2e \rightarrow A$; $E^o = +0.34$ V
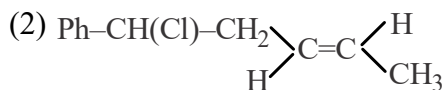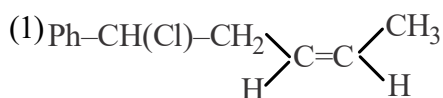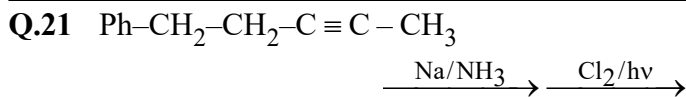and $\log_{10} K = 15.6$ at 300 K for cell reactions
Find E^o for $B^+ + e \rightarrow B$

Given $\left[\dfrac{2.303\ RT}{nF} = 0.059 \right]_{\text{at 300 K}}$
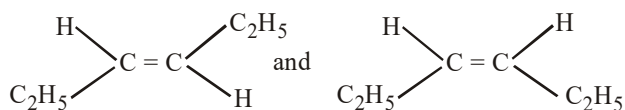
(1) 0.80
(2) 1.26
(3) – 0.54
(4) + 0.94

Q.20

Q.21 $Ph–CH_2–CH_2–C \equiv C – CH_3$

$$\xrightarrow{Na/NH_3} \xrightarrow{Cl_2/h\nu}$$

(1) Ph–CH(Cl)–CH₂ $C=C$ with CH_3 and H

(2) Ph–CH(Cl)–CH₂ $C=C$ with H and CH_3

(3) $Ph – CH_2 – CH(Cl) – CH = CH – CH_3$
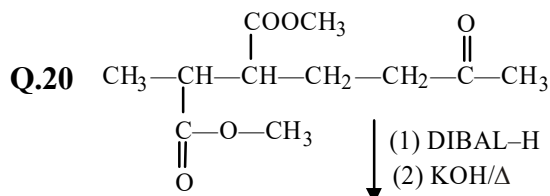
(4) None of these

Q.22 For geometric isomers of 3–hexene :

H, C₂H₅ / C = C / C₂H₅, H and H, H / C = C / C₂H₅, C₂H₅

(1) M.P. is high and dipole moment high for trans
(2) M.P. is low and dipole moment low for trans
(3) M.P. is high and dipole moment low for trans
(4) M.P. is low and dipole moment high for trans

Q.23 The reaction shown is a step from the mechanism of the addition of HX over an alkene without the arrows draw in. Which choice below correctly describes how the arrows should be drawn in?

H–Br $\longrightarrow$ ⊕ : Br ⊖

(1) A double headed arrow drawn from the least substituted carbon of the alkene to the hydrogen of HBr; a double headed arrow drawn from the H-Br bond to the bromine.

(2) A double headed arrow drawn from the pi bond of the alkene to the hydrogen of HBr; a double headed arrow drawn from the H-Br bond to the bromine.

(3) A double headed arrow drawn from the most substituted carbon of the alkene to the hydrogen of HBr; a double headed arrow drawn from the H-Br bond to the bromine.

(4) A single headed arrow drawn from the least substituted carbon of the alkene to the hydrogen of HBr; a double headed arrow drawn from the H-Br bond to the bromine.

Q.24 Which carbocation intermediate shown will undergo a rearrangement and form the most stable carbocation compared to the others?
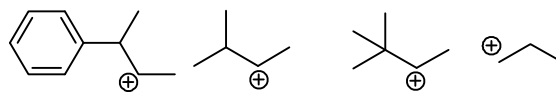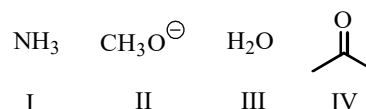
(1) I   (2) II
(3) III   (4) IV

Q.25 Which of the following would make a poor nucleophile?

NH_3 $CH_3O^{\ominus}$ H_2O (acetone)

I   II   III   IV

(1) I   (2) II
(3) III   (4) IV

Q.26 Arrange the following compounds in the increasing order of their acidic strength:
i. m-nitrophenol   ii. m-cresol
iii. phenol   iv. m-chlorophenol

(1) iii < ii < i < iv   (2) ii < iv < iii < i
(3) ii < iii < iv < i   (4) ii < iii < i < iv

Q.27 The number of R_2 Si $(OH)_2$ units required to prepare a silicone polymer containing 10 $Si – O – Si$ linkages is

(1) 1   (2) 9
(3) 3   (4) 8

Q.28 The outer electron configuration of Gd (Atomic No: 64) is $4f^7 5d^X 6s^2$. Find the value of X.

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

Q.29 What will be the solubility product of AX_3 ?

(1) $27 S^4$ (2) $4S^3$
(3) $36 S^4$ (4) $9S^3$

Q.30 On the basis of standard electrode potential of redox couples given below, find out which of the following is the strongest oxidising agent.
(E° values: $Fe^{3+} | Fe^{2+} = + 0.77$ V;
I_2 (s) $| I^- = + 0.54$ V; $Cu^{2+} | Cu = + 0.34$ V ;
$Ag^+ | Ag = + 0.80$ V)

(1) Fe^{3+} (2) $I_2(s)$
(3) Cu^{2+} (4) Ag^+

SPACE FOR ROUGH WORK

Q.31 Which of the following oxoacids of phosphorus is a reducing agent and a monobasic acid as well?
(1) $H_4P_2O_5$ (2) HPO_3
(3) H_3PO_3 (4) H_3PO_2

**Q.32** Calculate the overall complex dissociation equilibrium constant for the $[Cu(NH_3)_4]^{2+}$ ions, given that stability constant (β_4) for this complex is 2.1×10^{13}.
(1) 8.27×10^{-13} (2) 4.76×10^{-14}
(3) 2.39×10^{-7} (4) 1.83×10^{14}

Q.33 Choose the correctly paired gaseous cation and its magnetic (spin only) moment (in B.M.)
(1) Ti^{2+}, 3.87 B.M.   (2) Cr^{2+}, 4.90 B.M.
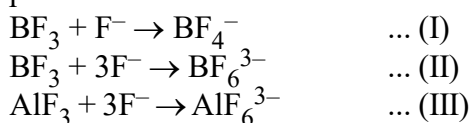(3) Co^{3+}, 3.87 B.M.   (4) Mn^{2+}, 4.90 B.M.

Q.34 Which is the major product formed when $C_6H_5CONHC_6H_5$ undergoes nitration?

(1)
(2)
(3)
(4)
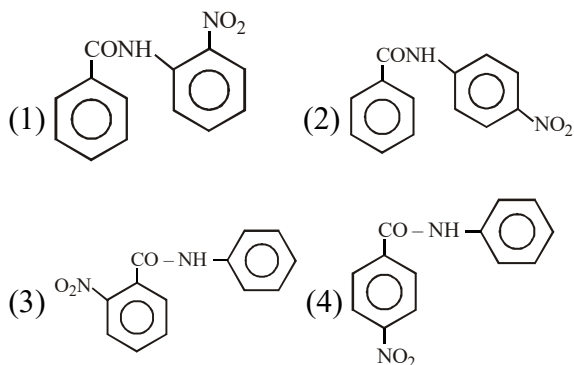
Q.35 Maltose is made of the units
(1) α-D glucose and β-D glucose
(2) α-D glucose and β-D fructose
(3) α-D glucose and α-D glucose
(4) α-D glucose and β-D galactose

Q.36 Which of the following reactions does not take place?
$BF_3 + F^- \rightarrow BF_4^-$ ... (I)
$BF_3 + 3F^- \rightarrow BF_6^{3-}$ ... (II)
$AlF_3 + 3F^- \rightarrow AlF_6^{3-}$ ... (III)
(1) Only (I)   (2) Only (II)
(3) Only (III)   (4) Only (I) and (III)

Q.37 Hydride of boron occurs as B_2H_6 but B_2Cl_6 does not exist. This is because
(1) $p\pi$-$d\pi$ back bonding is possible in B_2H_6 but not in B_2Cl_6.

(2) boron and hydrogen have almost equal values of electronegativity.
(3) boron and chlorine have almost equal atomic sizes.
(4) small hydrogen atoms can easily fit in between boron atoms but large chlorine atoms do not.

Q.38 The first ionisation enthalpy of Na, Mg and Si are 496, 737, 776 kJ/mol respectively. What will be the first ionisation enthalpy potential of Al in kJ/mol?
(1) > 766 kJ/mol
(2) > 496 and < 737 kJ
(3) > 737 and < 766 kJ/mol
(4) > 496 kJ/mol

Q.39 According to Hardy schulze law, the flocculating power of an ion increases with
(1) decrease in size   (2) increase in size
(3) decrease in charge   (4) increase in charge.

Q.40 In hcp (ABAB...) and ccp (ABCABC...) structures made up of spheres of equal size, the volume occupied per sphere (including the empty spaces) is (a = radius of sphere):
(1) $5.66\ a^3$ (2) $1.33\ a^3$
(3) $2.66\ a^3$ (4) $7.40\ a^3$

Q.41 Which of the following is monomeric unit of the polymer Nylon-5?

$-NH-(CH_2)_4-\underset{\underset{O}{\|}}{C}-NH-(CH_2)_4-\underset{\underset{O}{\|}}{C}-NH+(CH_2)_4-\underset{\underset{O}{\|}}{C}-$

(1) (2) (3)
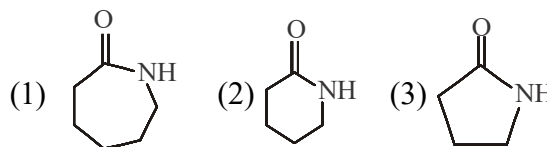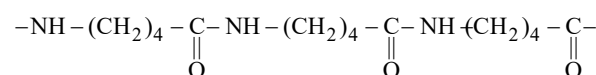
(4) $NH_2+(CH_2)_4-NH_2 + HOOC+(CH_2)_3-COOH$

Q.42 Choose the correct statement –
(i) The melting points and solubility in water of amino acids are generally higher than that of the corresponding halo acids
(ii) Monosaccharides are carbohydrates that can be hydrolysed further to give simpler units of polyhydroxy aldehyde or ketone.

    (iii) Reducing sugars are carbohydrates that reduce Fehling's solution and Tollen's reagent.

    (iv) Glycogen is a carbohydrate (polysaccharide).

    (1) i, iii, iv   (2) i, ii, iii

    (3) ii, iii, iv   (4) i, ii, iv

Q.43 Arrange the following in increasing order of their basic strength :

    (i) $C_2H_5NH_2$,   (ii) $C_6H_5NH_2$

    (iii) NH_3 (iv) $C_6H_5CH_2NH_2$

    (v) $(C_2H_5)_2NH$

    (1) (ii) < (iii) < (iv) < (i) < (v)

    (2) (i) < (iii) < (iv) < (ii) < (v)

    (3) (ii) < (iv) < (iii) < (i) < (v)

    (4) (ii) < (iii) < (iv) < (v) < (i)

Q.44 Choose the correct statement –

    (i) Fe^{2+} is stronger reducing agent than Cr^{2+}

    (ii) The most common oxidation state of Lanthanoids is +3.

    (iii) The magnetic moment of Ce^{3+} ion is 1.73BM.
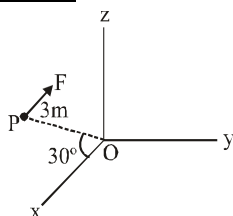
    (1) i, iii   (2) ii, iii

    (3) i, ii   (4) i, ii, iii

Q.45 Amongst the following, the most stable complex is-

    (1) $[Fe(H_2O)_6]^{3+}$ (2) $[Fe(NH_3)_6]^{3+}$

    (3) $[Fe(C_2O_4)_3]^{3-}$ (4) $[FeCl_6]^{3-}$

PART B – PHYSICS

Q.46 A force F = 2.0N acts on a particle P in the xz-plane. The force F is parallel to x-axis. The particle P (as shown in the figure) is at a distance 3m and the line joining P with the origin make angle 30º with the x-axis. The magnitude of torque on P with respect to origin O (in N–m) is :

   (1) 2   (2) 3

    (3) 4   (4) 5

Q.47 The diagram below shows as instantaneous position of a string as a transverse progressive wave travels along it from left to right

Which one of the following correctly shows the direction of the velocity of the points 1,2 and 3 on the string.

(1) $1 \rightarrow$; $2 \rightarrow$; $3 \rightarrow$ (2) $1 \rightarrow$; $2 \leftarrow$; $3 \rightarrow$

(3) $1 \downarrow$; $2 \downarrow$; $3 \downarrow$ (4) $1 \downarrow$; $2 \uparrow$; $3 \downarrow$

Q.48 In the circuit shown in the figure neglecting source resistance the voltmeter and ammeter reading will respectively be :
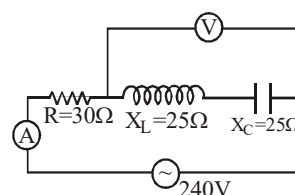
    (1) 0V, 3A   (2) 150V, 3A

    (3) 150V, 6A   (4) 0V, 8A

Q.49 Light of frequency $4\nu_0$ is incident on the metal of the threshold frequency ν_0. The maximum kinetic energy of the emitted photoelectrons is :

    (1) $3h\nu_0$ (2) $2h\nu_0$

    (3) $\dfrac{3}{2}h\nu_0$ (4) $\dfrac{1}{2}h\nu_0$

Q.50 A point mass m is suspended from a light thread of length ℓ, fixed at O, is whirled in a horizontal circle at constant speed as shown. From your point of view, stationary with respect to the mass, the forces on the mass are :
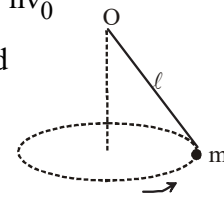
Q.51 Given $\vec{A} = 4\hat{i} + 6\hat{j}$ and $\vec{B} = 2\hat{i} + 3\hat{j}$ which of the following is correct :

(1) $\vec{A} \times \vec{B} = \vec{0}$

(2) $\vec{A} \cdot \vec{B} = 24$

(3) $\dfrac{|\vec{A}|}{|\vec{B}|} = \dfrac{1}{2}$

(4) $\vec{A}$ and $\vec{B}$ are antiparallel

Q.52 A beam of light converges to a point P. A lens is placed in the path of convergent beam 12 cm from P. At what point does the beam converge if the lens is a concave lens of focal length 16 cm ?

(1) 7.5 cm   (2) 48 cm

(3) 30 cm   (4) 7.1 cm

Q.53 A uniform thick rope of length 5m is kept on frictionless surface and a force of 5N is applied to one of its end. Find tension in the rope at 1m from this end-

(1) 1N   (2) 3N

(3) 4N   (4) 5N

Q.54 Two slits separated by a distance of 1 mm are illuminated with red light of wavelength 6.5×10^{-7} m. The interference fringe are observed on a screen placed 1m. from the slits. The distance between third dark fringe and the seventh dark fringe is equal to :

(1) 0.65 mm.   (2) 2.6 mm.

(3) 3.25 mm.   (4) 4.88 mm.

Q.55 In the circuit shown in figure the maximum output voltage V_0 is
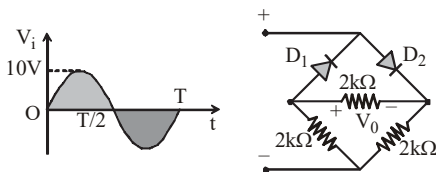
(1) 0 V   (2) 5 V

(3) 10 V   (4) 2V

Q.56 A 4 μF capacitor, a resistance of 2.5 MΩ is in series with 12 V battery. Find the time after which the potential difference across the capacitor is 3 times

the potential difference across the resistor.

[Given ln 2 = 0.693]

(1) 13.86 s   (2) 6.93 s

(3) 7 s   (4) 14 s

Q.57 The electric field of a plane electromagnetic wave varies with time of amplitude 2V/m propagating along z-axis. The average energy density of the magnetic field is (in Jm^{-3}) :

(1) 13.29×10^{-12} (2) 8.86×10^{-12}

(3) 17.72×10^{-12} (4) 4.43×10^{-12}

Q.58 Three masses are placed on the x-axis, 300g at origin, 500 g at x = 40 cm and 400 g at x = 70cm. The distance of the centre of mass from the origin is :

(1) 40 cm   (2) 45 cm

(3) 50 cm   (4) 30 cm

Q.59 A ball is released from a height of 10 m. If after the impact there is loss of 40% in its energy, the ball shall rise upto-

(1) 6 m   (2) 0.6 m

(3) 10 m   (4) 0.06 m

Q.60 In S.H.M., let the time period of variation of potential energy be T_1 and time period of variation of position be T_2, then relation between T_1 & T_2 is

(1) $T_1 = T_2$ (2) $T_1 = 2T_2$

(3) $2T_1 = T_2$ (4) None

Q.61 A block of mass m = 0.1 kg is released from a height of 4 m on a curved smooth surface. On the horizontal surface, path AB is smooth and path BC offers coefficient of friction μ = 0.1. If the impact of block with the vertical wall at C be perfectly elastic, the total distance covered by the block on the horizontal surface before coming to rest will be (take g = 10 ms^{-2})
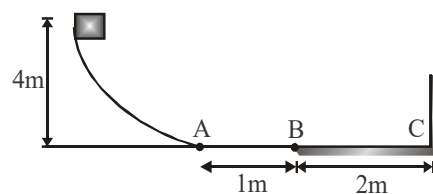
(1) 29 m   (2) 49 m

(3) 59 m   (4) 109 m

Q.62 2 kg of ice at –20°C is mixed with 5 kg of water at 20°C in an insulating vessel having a negligible heat capacity. Calculate the final mass of water remaining in the container. It is given that the specific heats of water and ice are 1 kcal/kg per °C and 0.5 kcal/kg/°C while the latent heat of fusion of ice is 80 kcal/kg :

(1) 7 kg   (2) 6 kg

(3) 4 kg   (4) 2 kg

Q.63 A conducting angle abc carries a current 5A then magnetic force on wire bc is :
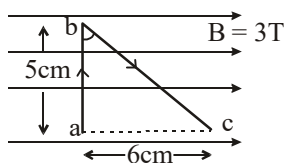
(1) 0.75 N   (2) 2N

(3) 0.1 N   (4) 1N

Q.64 A small planet is revolving around a very massive star in a circular orbit of radius R with a period of revolution T. If the gravitational force between the planet and the star were proportional to $R^{-5/2}$, then T would be proportional to :

(1) $R^{3/2}$ (2) $R^{3/5}$

(3) $R^{7/2}$ (4) $R^{7/4}$

Q.65 A monoatomic gas is suddenly compressed to 1/8 of its volume adiabatically. The ratio of pressure of the gas now to that of its original pressure is :

(1) 8 times   (2) 16 times

(3) 32 times   (4) 128 times

Q.66 Two short bar magnets of magnetic moments m each are arranged at the opposite corners of a square of side d such that their centres coincide with the corners and their axes are parallel. If the like poles are in the same direction, the magnetic induction at any of the other corners of the square is :

(1) $\dfrac{\mu_0}{4\pi}\dfrac{m}{d^3}$ (2) $\dfrac{\mu_0}{4\pi}\dfrac{2m}{d^3}$

(3) $\dfrac{\mu_0}{4\pi}\dfrac{m}{2d^3}$ (4) $\dfrac{\mu_0}{4\pi}\dfrac{m^3}{2d^3}$

Q.67 A conducting sphere of radius 10 cm has unknown charge. If the electric field at a distance 20 cm from the centre of the sphere is 1.2×10^3 N C^{-1} and points radially inwards. The net charge on the sphere is :

(1) -4.5×10^{-9} C   (2) 4.5×10^9 C

(3) -5.3×10^{-9} C   (4) 5.3×10^9 C

Q.68 A wire of irregular shape turning into a circular shape in a magnetic field which is directed into the paper. The direction of induced current is :
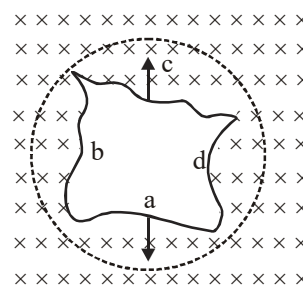
(1) along abcda

(2) along adcba

(3) into the plane of the paper

(4) out of the plane of the paper

Q.69 An α-particle moves in a circular path of radius 0.83 cm in the presence of a magnetic field of 0.25 Wb m^{-2}. The de Broglie wavelength associated with the particle will be

(1) 1 Å   (2) 0.1 Å

(3) 10 Å   (4) 0.01 Å

Q.70 A tank filled with fresh water has a hole in its bottom and water is flowing out of it. If the size of the hole is increased, then

(1) the volume of water flowing out per second will decrease.

(2) the velocity of outflow of water remains unchanged.

(3) the volume of water flowing out per second remains zero.

(4) Both (2) and (3)

SPACE FOR ROUGH WORK

Q.71 If the velocity v (in cm/s) of a particle is given in terms of time t (in sec) by the equation

$v = at + \dfrac{b}{t+c}$, then the dimensions of a, b and c are

(1) a-$[L^2]$, b-$[T]$, c-$[LT^2]$
(2) a-$[LT^2]$, b-$[LT]$, c-$[L]$
(3) a-$[LT^{-2}]$, b-$[L]$, c-$[T]$
(4) a-$[L]$, b-$[LT]$, c-$[T^2]$

Q.72 Three metal rods of the same material an identical in all respects are joined as shown in the figure. The temperatures at the ends are maintained as indicated. Assuming no loss of heat from the curved surfaces of the rods, the temperature at the junction X would be
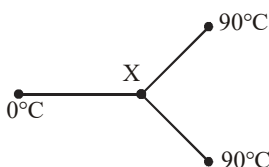
(1) 45°C   (2) 60°C
(3) 30°C   (4) 20°C

Q.73 A potentiometer wire of length 100 cm has a resistance of 10Ω. It is connected in series with a resistance and a cell of emf 2 V and of negligible internal resistance. A source of emf 10mV is balanced against a length of 40 cm of the potentiometer wire. What is the value of external resistance ?
(1) 790 Ω   (2) 890 Ω
(3) 990 Ω   (4) 1090 Ω

Q.74 A certain light truck can go around a curve having a radius of 150 m with a maximum speed of 32.0m/s. To have the same acceleration, at what maximum speed can it go around a curve having a radius of 75.0 m?
(1) 64 m/s   (2) 45 m/s
(3) 32 m/s   (4) 23 m/s

Q.75 Ball 1 is thrown into the air and it follows the trajectory for projectile motion shown in the drawing. At the instant that ball 1 is at the top of its trajectory, ball 2 is dropped from rest from the same height. Which ball reaches the ground first?
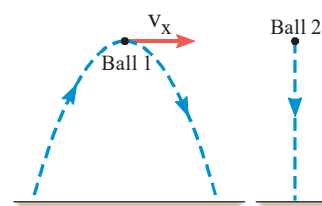
(1) Ball 1 reaches the ground first, since it is moving at the top of the trajectory, while ball 2 is dropped from rest.
(2) Ball 2 reaches the ground first, because it has the shorter distance to travel.
(3) Both balls reach the ground at the same time.
(4) There is not enough information to tell which ball reaches the ground first.

Q.76 A sample of a monatomic ideal gas is contained in a cylinder with a piston. Its state is represented by the dot in the PV diagram shown in Figure. Arrows A through E represent isobaric, isothermal, adiabatic, and isovolumetric processes that the sample can undergo. In each process except D, the volume changes by a factor of 2. All five processes are reversible. Rank the processes according to the change in entropy of the gas from the largest positive value to the largest-magnitude negative value. In your rankings, display any cases of equality.
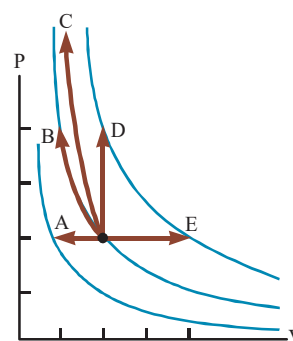
(1) E > D > C > B > A
(2) A > B > C > D > E
(3) E > D > B > C > A
(4) B > C > D > A > E

Q.77 A triply ionized beryllium (Be^{3+}) has the same orbital radius as the ground state of hydrogen. Then the quantum state n of Be^{3+} is
(1) n = 1   (2) n = 2
(3) n = 3   (4) n = 4

Q.78 In beta plus decay
(1) antineutrino is produced with electron.
(2) neutrino is produced with positron
(3) neutron is produced with electron
(4) none of these

Q.79 A capillary tube of radius r is immersed in water and water rises in it to a height 'h'. Mass of water in the capillary tube is 5×10^{-3} kg. Another capillary tube of radius (r/2) is immersed in water. The mass of water that will rise in this tube is –
(1) 7.5×10^{-3} kg   (2) 1×10^{-3} kg
(3) 2.5×10^{-3} kg   (4) 5×10^{-3} kg

Q.80 A ball of mass m moving with a horizontal velocity v strikes the bob of a pendulum at rest. Mass of the bob of the pendulum is also m. During this collision the ball sticks with the bob of the pendulum. The height to which the combined mass rises (g = acceleration due to gravity)
(1) $v^2/4g$ (2) $v^2/8g$
(3) v^2/g (4) $v^2/2g$

Q.81 A circuit consists of three identical lamps connected to a battery as in Figure. The battery has some internal resistance. The switch S, originally open, is closed. What then happens to the brightness of lamp B?
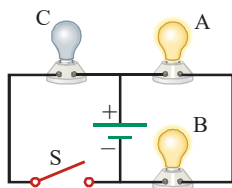

(1) It increases.
(2) It decreases somewhat.
(3) It does not change.
(4) It drops to zero.

Q.82 Mutual inductance M between two concentric circular coils of radii 1 m and 2 m is
(1) $\dfrac{\mu_0\pi}{2}$ (2) $\dfrac{\mu_0\pi}{4}$
(3) $\dfrac{\mu_0\pi}{8}$ (4) $\dfrac{\mu_0\pi}{10}$

Q.83 In Figure, the switch is left in position a for a long time interval and is then quickly thrown to position b. Rank the magnitudes of the voltages across the four circuit elements a short time thereafter from the largest to the smallest.
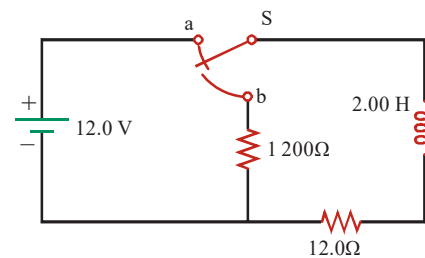
(1) $\Delta V_L > \Delta V_{1200\,\Omega} > 12.0\,V > \Delta V_{12\Omega}$.
(2) $\Delta V_{1200\,\Omega} > \Delta V_L > 12.0\,V > \Delta V_{12\Omega}$.
(3) $\Delta V_L > \Delta V_{1200\,\Omega} > \Delta V_{12\Omega} > 12.0\,V$
(4) $\Delta V_{1200\,\Omega} > 12.0\,V > \Delta V_L > \Delta V_{12\Omega}$.

Q.84 A sonometer wire has a length of 114 cm, between two fixed ends. Where should two bridges be placed so as to divide the wire into three segments (in cm) whose fundamental frequencies are in the ratio 1 : 3 : 4?
(1) $\ell_1, \ell_2, \ell_3 = 18, 24, 72$
(2) $\ell_1, \ell_2, \ell_3 = 24, 18, 72$
(3) $\ell_1, \ell_2, \ell_3 = 72, 18, 24$
(4) $\ell_1, \ell_2, \ell_3 = 72, 24, 18$

Q.85 The frequency of vibration in a vibration magnetometer of the combination of two bar magnets of magnetic moments M_1 and M_2 is 6 Hz when like poles are tied and it is 2 Hz when the unlike poles are tied together, then the ratio $M_1 : M_2$ is
(1) 4 : 5   (2) 5 : 4
(3) 1 : 3   (4) 3 : 1

Q.86 A sound source producing waves of frequency 300Hz and wavelength 1m observer is stationary, while source is going away with the velocity 30 m/s, then apparent frequency heared by the observer is
(1) 270 Hz (2) 275 Hz
(3) 383 Hz (4) 300 Hz

Q.87 Angular magnification produced by astronomical telescope for normal adjustment is 10 and length of telescope is 1.1m. The angular magnification when the image is formed at least distance of distinct vision (D = 25 cm) is -
(1) 14 (2) 6
(3) 16 (4) 18

Q.88 A uniform solid sphere of radius r is placed on a horizontal surface. A horizontal impulse I is applied on it at a height h above the center as shown in the figure. If soon after the impact sphere starts rolling (without slipping) the ratio of h/r is:
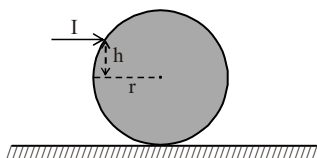
(1) 1/2 (2) 1/5
(3) 2/5 (4) 1/4

Q.89 An engine has an efficiency of 0.25 when temperature of sink is reduced by 58°C, if its efficiency is doubled, then the temperature of the source is :
(1) 150°C (2) 222°C
(3) 242°C (4) 232°C

Q.90 4th harmonic of an open organ pipe has frequency 33 Hz lesser than 5th harmonic of same open organ pipe. Find the length of the pipe (in meters). (Assume velocity of sound in air = 330 m/s. Neglect end correction.)
(1) 5 (2) 4
(3) 3 (4) 2

PART C – BIOLOGY

Q.91 Which statement in given question is correct ?
(1) For a detailed evaluation of the hearts function, multiple leads are attached to the chest region.
(2) To obtain standard ECG, multiple leads are attached to chest region.
(3) QRS complex represents repolarisation of ventricle.
(4) pip__pip__peeeee sound in electro-cardiogram shows that person goes in heart failure.

Q.92 The egg apparatus consists of .. ...(a)..... antipodals and .....(b)..... egg cell :
(1) a – One, b – One (2) a – Two, b – Two
(3) a – Three, b – One (4) a – One, b – Two

Q.93 In flowering plants fertilization occurs in :
(1) Ovary (2) Embryosac
(3) Nucellus (4) Ovule

Q.94 Identify the correct matching option :

Disease	Symptom
(1) Arthritis	Inflammation of cartilages
(2) Osteoporosis	Age related disorder due to deficiency of estrogen
(3) Gout	Joints inflammed due to antigens.
(4) Fracture	Destruction of tendons & ligaments.
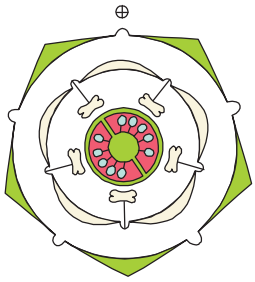
Q.95 Match the column
(a) Virus (i) Schwann
(b) Viroid (ii) T.O. diener
(c) Cell (iii) Pasteur
(d) Ribosome (iv) Palade
(1) a–iii, b–ii, c–i, d–iv (2) a–ii, b–i, c–iv, d–iii
(3) a–i, b–ii, c–iii, d–iv (4) a–iv, b–iii, c–i, d–ii

Q.96 Which of the following statement is not correct ?
(1) In translation, amino acids are added one by one, translated into polypeptide sequences dictated by DNA and represented by m-RNA.
(2) Lac operator is present only in the lac operon and it interact specifically with lac repressor only.

SPACE FOR ROUGH WORK

(3) UTR (Untranslated regions) are present at both 5' end (before start codon) and at 3' end (after stop codon).

(4) In eukaryotes, control of the rate of transcriptional initiation is the predominant site for control of gene expression.

Q.97 Which of the following is natural and true product of bee keeping ?

(1) Pollen   (2) Honey

(3) Wax   (4) Both (2) and (3)

Q.98 When faeces are retained with in the rectum as bowel movements occur irregularly, it is called -

(1) Diarrhoea   (2) Vomiting

(3) Constipation   (4) Jaundice

Q.99 Sympathetic nervous system is not related to -

(1) Tachycardia   (2) Bronchodilation

(3) Constriction of pupil (4) Ejaculation

Q.100 Type of fertilization in Chondrichthyes and Osteichthyes is_____

(1) External and internal (2) Internal and external

(3) Internal only   (4) External only

Q.101 Mark correct statements :

(a) Four haploid cells are formed at the end of meiosis-II

(2) In E. coli, to complete cell cycle it takes about 90 minutes.

(3) Inner mitochondrial membrane forms infoldings called cristae

(4) Interphase is the phase between two successive M-phase

(1) Only d   (2) a, c & d

(3) Only b   (4) All are correct

Q.102 Auxin was first isolated from

(1) Human urine   (2) Callus

(3) Coconut milk   (4) None

Q.103 Which of the following type of classification based on evolutionary relationship between the various organism :

(1) Natural classification

(2) Phylogenetic classification

(3) Phenetic classification

(4) Artificial classification

Q.104 The plant which have this floral diagram possess?

(a) Papilionaceous corolla

(b) Swollen placenta

(c) Epipetalous condition

(d) Epiphyllous condition

(1) a, b, c, d   (2) a, b

(3) b, c   (4) b, c, d

Q.105 Select the correct statement :

(1) Gymnosperm are both homosporous and heterosporous

(2) *Marsilea, Ginkgo* and *Pinus* all are gymnosperms

(3) The leaves of gymnosperms are not well adapted to extremes of climate

(4) *Sequoia* is known as father of forest

Q.106 Which of the following statement is incorrect regarding parturition :

(1) Parturition is a complex neuro-endocrine mechanism.

(2) Estrogen and progesterone ratio decreases.

(3) Oxytocin is the main parturation hormone.

(4) Foetal ejection reflex generates.

Q.107 200 million year ago some reptiles went back into water to evolve into fish like reptiles. These were probably:

(1) *Icthyosaurus*   (2) *Tyrannosaurus*

(3) *Pteranodon*   (4) *Stegosaurus*

Q.108 "Erythropoietin" hormone related to :

(1) Blood pressure

(2) Formation of R.B.C

(3) Water level of blood

(4) Glucose level of blood

SPACE FOR ROUGH WORK

Q.109 Which of the following cross is utilized to know the location of gene ?
(1) Test cross   (2) Out cross
(3) Inbreeding   (4) Reciprocal cross

Q.110 If the vagus nerves (main nerves of the parasympathetic nervous system) were cut, which of the following would not be true ?
(1) The heart would stop beating
(2) The diaphragm would be paralysed
(3) Adrenaline secretion by the adrenal gland would cease
(4) None of (1), (2) and (3)

Q.111 Read the following (a-d) statements :
(a) Connective tissue are most abundant and widely distributed in the body of complex organism.
(b) Connective tissue helps in linking and supporting other tissue or organs in of the body.
(c) Adipose tissue is a type of dense connective tisue.
(d) Connective tissue does not secrete its matrix.
Choose the incorrect statements is :
(1) a, c & d   (2) a and b
(3) c and d   (4) Only d

Q.112 The person with 'O$^+$' blood group, who was seriously injured during an accident, can recieve the blood of following individual :-
(1) AB$^+$ (2) O$^-$
(3) B$^-$ (4) All of the above

Q.113 If the circular ciliary muscles of the eye are unable to contract, the
(1) Lens will become more convex.
(2) Lens will be thin and stretched.
(3) Vision will be lost completely.
(4) Bright light will have no adverse effect on retina

Q.114 Ecology at the organism level is essentially called :
(1) Morphological ecology
(2) Physiological ecology
(3) Anatomical ecology
(4) Behavioral ecology

Q.115 Which statement is incorrect regarding cockroach?
(1) I & III spiracle are permanently open
(2) Anal cerci are present only in male
(3) In females, 7th sternum is boat shaped
(4) Each compound eye has 2000 ommantidia

Q.116 The rate of new carbon material formed by heterotrophs is called :
(1) GPP   (2) NPP
(3) NCP   (4) Secondary productivity

Q.117 The permease of the lac operon is synthesised :
(1) constitutively from the i gene
(2) only when required from the i gene
(3) constitutively from the y gene
(4) only when required from the y gene

Q.118 Deuteromycetes are known as fungi imperfecti because –
(1) their zygote undergoes meroblastic and holoblastic cleavage.
(2) only asexual stages are known.
(3) they have aseptate mycelium.
(4) they are autotrophic.

Q.119 Which of the following will be least adversely affected by competition ?
(1) Grass   (2) Rabbit
(3) Deer   (4) Lion

Q.120 Select the correct match :
(1) Denitrification - *nitrobacter*
(2) Photoautotroph - *nitrococcus*
(3) Necrosis - N, P, K, S
(4) Delay in flowering - Mo, S, N

Q.121 Read following statements.
(a) Human leucocyte antigen is present on leucocytes only.
(b) Alleles for expression of human leucocyte antigen are present on chromosome no. 6.
(c) Human leucocyte antigen is present only on RBC surface.
(d) Human leucocyte antigen mismatching is major reason for allograft rejection.
(e) Allograft rejection is due to cell mediated immunity.
(1) a, b, c are correct   (2) a, c, d are correct
(3) a, b, e are correct   (4) b, d, e are correct

SPACE FOR ROUGH WORK

Q.122 Occurrence of triploid (3n) primary endosperm nucleus is a characteristic feature of –
(1) algae
(2) gymnosperms
(3) angiosperms
(4) bryophytes.

Q.123 Which of the following statement is correct ?
(1) Brown algae posses chlorophyll a,b carotenoids, and xanthophyll.
(2) Majority of red algae are fresh water.
(3) Volvox, Fucus, Ulothrix are green algae.
(4) Sexual Reproduction may be isogamous, anisogamous or oogamous in brown algae.

Q.124 Which group of animals can respire through skin ?
(1) Pisces
(2) Amphibia
(3) Reptelia
(4) Aves

Q.125 Which of following is a hydrogen carrier ?
(1) UQ
(2) Cyt b
(3) Cyt C
(4) Cyt C$_1$
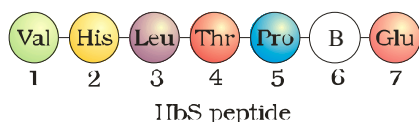
Q.126 Which of the following known as seed fern :
(1) Cycadofillicales
(2) Cycadales
(3) Coniferales
(4) Gnetales

Q.127 Which of the following is true for given diagram

Sickle-cell Hb(S) gene —GTG—
—CAC—

mRNA —GUG—

HbS peptide

Val - His - Leu - Thr - Pro - B - Glu
1   2   3   4   5   6   7

HbS peptide

(1) A → Autosomal dominant
(2) B → Glutamic acid
(3) B → Valine
(4) It is caused due to bacteria

Q.128 The amino acid attaches to the tRNA at its :
(1) 5' end
(2) Anticodon site
(3) 3' end
(4) DHU loop

Q.129 When resource in habitat are unlimited, growth have?
(1) Sigmoid growth curve
(2) J-shape growth curve
(3) Logistic growth curve
(4) Both 1 and 3

Q.130 Identify the disease according to given points :
(a) Sustained high fever
(b) Weakness
(c) Headache
(d) Loss of appetite
(1) Ascariasis
(2) Amoebiasis
(3) Typhoid
(4) Cholera

Q.131 The diagram shown compares a normal chromosome with one that has undergone a rearrangement. The rearrangement is BEST described as a/an

A B C D E F G
↓
A B E D C F G

(1) deletion
(2) duplication
(3) nondisjunction
(4) inversion

Q.132 Which DNA technique depends, in part, on a violation of Mendel's law of independent assortment?
(1) Shotgun genome sequencing
(2) RFLP
(3) PCR
(4) Genome marker mapping

**Q.133** Which of these is/are responsible for an increase in the thickness of a plant?
I. Apical meristem
II. Vascular cambium
III. Cork cambium
(1) I only
(2) II only
(3) III only
(4) II and III

Q.134 Which correctly describes a process or event in the female reproductive cycle?
(1) The cycle is regulated via a negative feedback loop.
(2) The corpus luteum releases an egg into a fallopian tube.
(3) Estrogen and progesterone cause a follicle to mature.
(4) A maturing follicle causes the uterine lining to build up.

SPACE FOR ROUGH WORK

Q.135 Researchers tracked the incidence of a single-gene trait in a family. A single allele can mask the phenotype of the allele for this trait. Their findings are shown in the pedigree below.
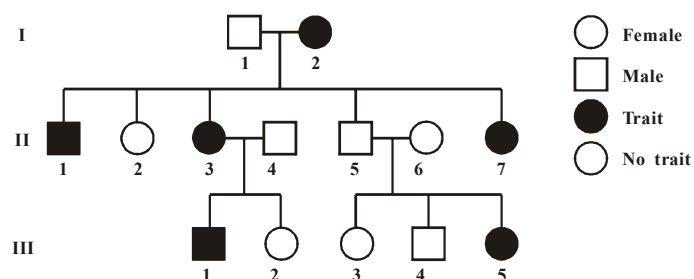
According to the pedigree, what is the most likely genotype of individual III-5?
(1) Carrier
(2) Unaffected
(3) Homozygous recessive
(4) Homozygous dominant

Q.136 Cyanobacteria are photosynthetic prokaryotes. Which organelles do cyanobacteria cells contain?
I. Chloroplasts II. Nucleus
III. Ribosomes
(1) I only (2) II only
(3) III only (4) I and II only

Q.137 Which of the following plays an important role in the human immune system?
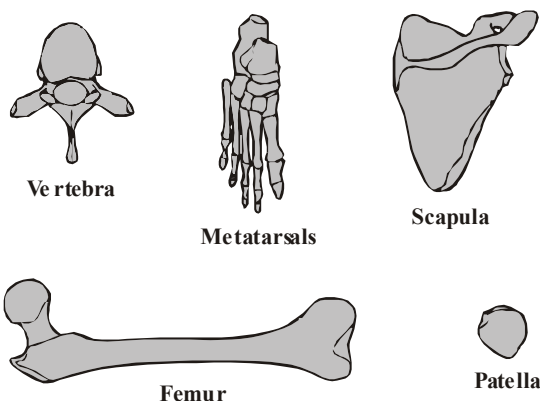
(1) Femur (2) Metatarsals
(3) Patella (4) Scapula

Q.138 How does the ATP synthase enzyme function in the cell?
(1) It uses energy to move ions against their concentration gradient by removing a phosphate group from ATP.
(2) It uses the power of ions moving against their concentration gradient to add a phosphate group to ADP.
(3) It uses the power of ions moving down their concentration gradient to add a phosphate group to ADP.
(4) It uses the power of ions moving against their concentration gradient to remove a phosphate group from ATP.

Q.139 Which choice matches each description below to the correct stage of aerobic respiration?
I. Produces most of the ATP
II. Produces carbon dioxide (CO_2)
III. Uses oxygen (O_2)
(1) I = chemiosmosis; II = electron transport chain; III = citric acid cycle
(2) I = chemiosmosis; II = citric acid cycle; III = electron transport chain.
(3) I = citric acid cycle; II = chemiosmosis; III = electron transport chain.
(4) I = electron transport chain; II = chemiosmosis; III = citric acid cycle

Q.140 All of the following take place in the thylakoid of the chloroplast EXCEPT
(1) $NADP^+$ is reduced to create NADPH.
(2) hydrogen ions are pumped against their concentration gradient.
(3) ATP is produced by the ATP synthase enzyme
(4) carbon dioxide molecules are converted to a three-carbon sugar

Q.141 How did the results of the Urey-Miller experiment affect the Oparin hypothesis?
(1) The results supported the Oparin hypothesis by showing that organisms contributed to the composition of Earth's present-day atmosphere.

(2) The results contradicted the Oparin hypothesis by showing that Earth's early atmosphere could not produce cells from organic molecules.

(3) The results supported the Oparin hypothesis by showing that replicating membranes could form from simple molecular precursors.

(4) The results supported the Oparin hypothesis by showing that biological molecules could form in conditions resembling the early Earth.

Q.142 Which of these describes an adaptation to an arid environment?

(1) A short loop of Henle, which allows more filtrate to be removed from the blood.

(2) A short loop of Henle, which allows less water to be removed from the filtrate.

(3) A long loop of Henle, which allows more filtrate to be removed from the blood.

(4) A long loop of Henle, which allows more water to be removed from the filtrate.

Q.143 C_4 plants have better productivity because –

(1) C_4 plants absorb more light

(2) C_4 plants absorb more CO_2

(3) C_4 plants does not carry photorespiration

(4) C_4 plants have more amount of RuBisCO.

Q.144 The graph shows the body size distribution in a population.
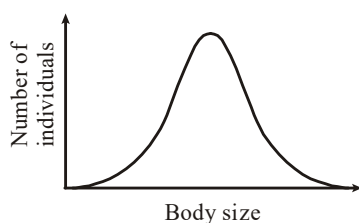
Which statement describes the effects of stabilizing selection on the distribution?

(1) The mean shifts, and the curve remains the same.

(2) The mean shifts, and the curve becomes narrower.

(3) The mean remains the same, and the curve becomes wider.

(4) The mean remains the same, and the curve becomes narrower.

Q.145 Which of the following plant growth regulators (PGRs) promotes root initiation, flowering and induced parthenocarpy?

(1) Gibberellin (2) Auxin

(3) Cytokinin (4) Ethylene

Q.146 The chemiosmotic coupling hypothesis of oxidative phosphorylation proposes that adenosine triphosphate (ATP) is formed because –

(1) a proton gradient forms across the inner mitochondrial membrane.

(2) there is a change in the permeability of the inner mitochondrial membrane towards adenosine diphosphate (ADP).

(3) high energy bonds are formed in mitochondrial proteins.

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

Q.147 Hiccups can be best described as

(1) forceful sudden expiration.

(2) forceful contraction of intercostal muscles during deep breathing.

(3) vibration of the soft palate during breathing while sleeping.

(4) jerky incomplete inspiration.

Q.148 Refer the given figure of nephron. Identify a, b, c and d and select the correct option regarding them


(1) a-Glomerulus - a tuft of capillaries formed by afferent arteriole.

(2) b-PCT-reabsorption of HCO_3^- and selective secretion of H^+ and K^+ occurs here.

(3) c-DCT-almost all glucose, amino acids, water, Na^+, K^+ and uric acid are absorbed here.

(4) d-collecting duct-extends from the cortex of the kidney to the inner parts of medulla. Large amount of water is secreted in this region.
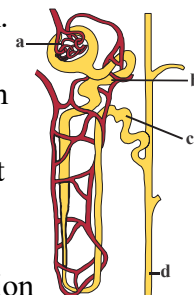
Q.149 Select the correct option regarding a, b and c.
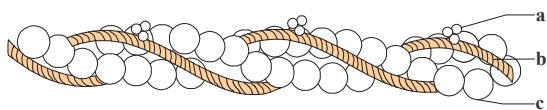
(1) a-Tropomyosin-runs close to F-actin throughout its length.

(2) b- Troponin-complex protein distributed at regular interval of tropomyosin.

(3) c-F actin - polymer of monomeric G-actin helically bound to each other.

(4) None of these

Q.150 Select the correct statement about hormones and their actions.

(1) Parathyroid hormone increases K^+ absorption of the body.

(2) Insulin and glucagon helps to maintain blood sugar levels.

(3) Old aged people have weak immunity due to increased activity of thymus.

(4) Osteoporosis in women occurs due to increased levels of oestrogens.

Q.151 After double fertilisation, a mature ovule has

(1) 1 diploid and 1 haploid cell

(2) 1 diploid and 1 triploid cell

(3) 2 haploid and 1 triploid cell

(4) 1 haploid and 1 triploid cell.

Q.152 Match column I with column II and select the correct option from the given codes.

Column I	Column II
a. Parthenocarpy	(i) Seed formation without fertilisation.
b. Polyembryony	(ii) More than one embryo in same seed.
c. Apomixis	(iii) Seedless fruits without fertilsation.
d. Somatic	(iv) Embryo develops from a embryogenesis somatic cell.

(1) a - (iv), b - (ii), c - (iii), d - (i)

(2) a - (iii), b - (ii), c - (i), d - (iv)

(3) a - (i), b - (iv), c - (iii), d - (ii)

(4) a - (ii), b - (iii), c - (i), d - (iv)

Q.153 Which of the following contraceptive devices make uterus unsuitable for implantation?

(1) Progestasert   (2) CuT

(3) Lippe's loop   (4) Multiload

Q.154 Which of the following statements is correct regarding menstrual cycle?

(1) LH induces rupturing of Graafian follicle.

(2) Proliferative phase is characterised by the increased production of progesterone.

(3) Corpus luteum secretes large amount of estrogen.

(4) Both LH and FSH attain a peak level in secretory phase.

Q.155 Select the correct sequence for *Homo erectus*.

(1) *Erectus* → *homo* → primata → chordata → animalia

(2) *Homo* → *erectus* → primata → animalia → chordata

(3) *Homo* → *erectus* → primata → chordata → animalia

(4) *Erectus* → *homo* → animalia → primata → chordata

Q.156 Which one of the following immune system components does not correctly match with its respective role?

(1) Interferons - secreted by virus-infected cells and protect non-infected cells from further viral infection.

(2) B-lymphocytes-produces antibodies in response to pathogens into blood to fight with them.

(3) Macrophages-mucus secreting cells that trap microbes entering in the body

(4) IgA-present in colostrum in early days of lactation and protect infant from diseases.

Q.157 Albuminous seeds are found in–

(1) Pea, Groundnut, Castor

(2) Castor, Sunflower, Barley

(3) Wheat, Barley, Castor

(4) Pea, Groundnut, Sunflower

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Q.158 Which of the following statements is not true?
(1) The biodiversity decreases with increasing latitude.
(2) The biodiversity decreases with increasing altitude.
(3) The fishes show greatest biodiversity among vertebrates.
(4) The biodiversity of bryophytes is greater than that of angiosperms.

Q.159 Match the following and select the correct option.

Column- I	Column-II
a. Emphysema	(i) Increase in the concentration of non-biodegradable substances in food chains
b. ADA deficiency	(ii) α-1 antitrypsin
c. Eutrophication	(iii) Bone marrow ∞ transplantation
d. Biomagnification	(iv) Nutrient enrichment of a water body.

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

Q.160 One greenhouse gas contributes 14% to total global warming and another contributes 6%. These are respectively identified as –
(1) N_2O and CO_2
(2) CFCs and N_2O
(3) methane and CO_2
(4) methane and CFCs.

Q.161 Which of the following microbes is correctly paired with its function?
(1) *Aspergillus niger* – Production of lactic acid
(2) *Trichoderma polysporum* – Lowers blood cholesterol
(3) *Saccharomyces cerevisiae* – Production of citric acid
(4) Methanogcnic bacteria - Gobar gas formation

Q.162 Which of the following antibiotics is not correctly matched with the source from which it is obtained?

Antibiotic	Source
(1) Penicillin	*Penicillium chrysogenum*
(2) Bacitracin	*Bacillus licheniformis*
(3) Griseofulvin	*Penicillium griseofulvum*
(4) Streptomycin	*Bacillus griseus*

Q.163 The products of oxidative phosphorylation are
(1) oxygen and water
(2) NADH and ATP.
(3) pyruvate and NADPH.
(4) water and ATP

Q.164 Respiratory organs of whale are
(1) Book lungs (2) Lungs
(3) Gills (4) Skin

Q.165 Characteristic of birds is –
(1) Unisexual and sexual dimorphism absent
(2) Bisexual and sexual dimorphism absent
(3) Unisexual and sexual dimorphism present
(4) Bisexual and sexual dimorphism present

Q.166 At which stage of the cell cycle are histone proteins synthesized in a eukaryotic cell?
(1) During telophase
(2) During S-phase
(3) During G_2-stage of prophase
(4) During entire prophase

Q.167 Which of the following genera is associated with coralloid roots?
(1) *Cycas* (2) *Taxus*
(3) *Pinus* (4) *Sequoia*

Q.168 Which of the following are homosporous pteridophytes?
I. *Selaginella* II. *Lycopodium*
III. *Salvinia* IV. *Equisetum*
(1) I and IV only (2) II and III only
(3) II and IV only (4) III and IV only

Q.169 Select the **incorrect** statement.
(1) *Periplaneta* has compound eyes.
(2) Earthworm shows segmentation.
(3) *Ascaris* shows sexual dimorphism.
(4) Liver fluke has a complete alimentary canal.

Q.170 Select the animal that exhibits retrogressive metamorphosis.
(1) *Bufo* (2) *Amphioxus*
(3) *Limulus* (4) *Herdmania*

Q.171 Select the option that correctly matches characteristic features with the group of three animals.
(1) Skeleton of spicules
- *Sycon, Adamsia, Spongilla*
(2) Excretion by flame cells-
- *Taenia, Fasciola, Ancylostoma*
(3) Mouth contains radula
- *Dentalium, Octopus, Ophiura*
(4) Jointed appendage - *Limulus, Apis, Laccifer*

Q.172 Which of the following is correctly matched?
(1) *Monstera*- Fibrous root
(2) *Dahlia*- Fasciculated root
(3) *Azadirachta* - Adventitious root
(4) *Basil*- Prop roots

Q.173 Chromatin is made up of –
(1) DNA and protein.
(2) DNA and histone.
(3) DNA, RNA, protein
(4) RNA, histone and oil bodies.

Q.174 From the following groups, select the one which has only secondary metabolites?
(1) Arbrin, cellulose, arginine, tyrosine
(2) Glycine, gums, serine, diterpenes
(3) Carotenoids, phenylalanine, curcumin, rubber
(4) Conclavin-A, morphine, codeine, vinblastin

Q.175 Match Column - I with Column - II and select the correct option from codes given below.

Column - I	Column - II
a. Pigments	(i) Abrin, ricin
b. Toxins	(ii) Concanavalin A
c. Alkaloids	(iii) Carotenoids
d. Lectins	(iv) Morphine, codeine

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

Q.176 Beads on string like structures of 'a' are seen in 'b', which further condense to form chromosomes in 'c' stage of cell division.
(1) a-Chromonema, b-Chromatin, c-Metaphase
(2) a-Chromatin, b-Chromatid, c-Metaphase
(3) a-Chromonema, b-Chromosome, c- Anaphase
(4) a-Chromonema, b-Chromatid, c-Anaphase

Q.177 The genetic material in tobacco mosaic virus is
(1) ss DNA (2) ss RNA
(3) ds RNA (4) ds DNA

Q.178 Yeast is not included in protozoans but in fungi because –
(1) it has chlorophyll.
(2) it shows saprotrophic mode of nutrition.
(3) it has eukaryotic organisation.
(4) cell wall is made up of cellulose and reserve food material as starch.

Q.179 Match the following and select the correct option.

Column - I	Column - II
a. *Pteris*	(i) Gymnosperm
b. *Cycas*	(ii) Bryophyte
c. *Sphagnum*	(iii) Algae
d. *Sargassum*	(iv) Pteridophyta

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

Q.180 Select one of the following pairs of important features distinguishing *Gnetum* from *Cycas* and *Pinus* and showing affinities with angiosperms.
(1) Perianth and no integuments.
(2) Embryo development and apical meristem.
(3) Absence of resin duct and leaf venation.
(4) Presence of vessel elements and absence of archegonia.

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