PHYSICS
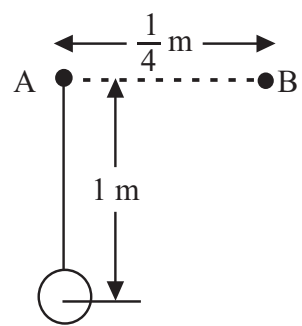
1. Given that the displacement of an oscillating particle is given by y=A sin (Bx + Ct + D). The dimensional formula for (ABCD) is
   (a) $[M^0L^{-1}T^0]$
   (b) $[M^0L^0T^{-1}]$
   (c) $[M^0L^{-1}T^{-1}]$
   (d) $[M^0L^0T^0]$

2. In the relation y=a cos (? t - Kx), the dimensional formula of k is
   (a) $[M^0L^{-1}T^1]$
   (b) $[M^0LT^{-1}]$
   (c) $[M^0L^{-1}T^0]$
   (d) $[M^0LT]$

3. A capillary tube is attached horizontally to a constant heat arrangement. If the radius of the capillary tube is increased by 10 %, then the rate of flow of liquid will change the nearly by
   (a) +10%
   (b) +46%
   (c) -10%
   (d) -40%

4. A man of mass 60 kg is the riding in a lift. The weight of the man, when the lift is accelerating upwards and downwards at 2 ms^{-2}, are respectively (Taking g=10 ms^{-2})
   (a) 720 N sand 480 N
   (b) 480 N and 720 N
   (c) 600 N and 600 N
   (d) None of the above

5. A man of the mass 60 kg is standing on a spring balance inside a lift. If the lift falls freely downwards, then the reading of the spring balance will be
   (a) zero
   (b) 60 kgf
   (c) <60 kgf
   (d) >60 kgf

6. If two forces each of 2 N are inclined at 60°, then resultant force is
   (a) 2 N
   (b) 2 3 N
   (c) 3 2 N
   (d) 4 2 N

7. A person of mass 60 kg is inside a lift of mass 940 kg and presses the button on control panel. The lift start moving upwards with an acceleration 1.0 ms^{-2}. If g=10 ms^{-2}, the tension on the supporting cable is
   (a) 9680 N
   (b) 11000 N
   (c) 1200 N
   (d) 8600 N

8. A mass of 0.5 kg moving with a speed of 0.5 ms^{-1} on a horizontal smooth surface, collides with a nearly weightless spring of force constant k = 50 Nm^{-1}. The maximum compression of the spring would be
   (a) 0.15 m
   (b) 0.12 m
   (c) 1.5 m
   (d) 0.5 m

9. A body is thrown vertically up with certain initial velocity. The potential and kinetic energies of the body are equal at a point P in its path. If the same body is thrown with double the velocity upwards, the ratio of the potential and kinetic energies of the body when its crosses the same point, is
   (a) 1:1
   (b) 1:4
   (c) 1:7
   (d) 1:8

10. For a system to follow the law of conservation of linear momentum during a collision, the condition is
    (a) total external force acting on the system is zero.
    (b) total external force acting on the system is finite and time of collision is negligible.
    (c) total internal force acting on the system is zero.
    (d) None of these

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11. Radius of gyration of disk of mass 50 kg and radius .5 cm about an axis passing through its centre of gravity and perpendicular to the plane is
(a) 6.54 cm   (b) 3.64 cm
(c) 1.77 cm   (d) 0.88cm

12. At any instant, a rolling body may be considered to be in pure rotation about an axis through the point of contact. This axis is translating forward with speed
(a) equal to centre of mass
(b) zero
(c) twice of centre of mass
(d) no sufficient data

13. Which of the following statement is/are true?
(a) A clock when taken on a mountain can be made to give correct time if we change the length of pendulum suitably
(b) An increase in value of g makes a clock go slow
(c) If the length of a pendulum is increased, the clock becomes fast
(d) A clock when taken to a deep mine or carried to the top a mountain becomes slow

14. The density of nearly discovered planet is twice that of earth. The acceleration due to gravity at the surface of the planet is equal to that the surface of the earth. If the radius of the earth is R, the radius of the plane will be
(a) 2R   (b)4R
(c) ¼ R   (d) ½ R

15. The mass of the earth is 6.00×10^{24} kg and that of the moon is 7.40×10^{22} kg. The constant of gravitation $G = 6.67 \times 10^{-11}$ N-$m^2 kg^2$. The potential energy of the system is -7.79×10^{28} J. The mean distance between the earth and moon is

(a) 3.80×10^{8} m   (b) 3.37×10^{6} m
(c) 7.60×10^{2} m   (d) 1.90×10^{2} m

16. At what temperature, hydrogen molecules will escape from the earth's surface? (take mass of hydrogen molecules = 0.34×10^{-26} kg, Boltzmann constant = 1.38×10^{-23} JK^{-1}, Radius of earth = 6.4×10^{6} m and acceleration due to gravity $= 9.8$ ms^{-2})
(a) 10 K   (b) 10^{2} K
(c) 10^{3} K   (d) 10_{4} K

17. Wires A and B are made from the same material. A has twice the diameter and the three times of length of B. If the elastic limits are not reached, when each is stretched by the same tension, the ratio of energy stored in A to that in B is
(a) 2:3   (b) 3:4
(c) 3:2   (d) 6:1

18. A stress of 3.18×10^{8} Nm^{-2} is applied to a steel rod of length 1m along its length its Young's modulus is 2×10^{11} Nm^{-2}. Then the elongation produced in the rod (in mm) is
(a) 3.18   (b) 6.36
(c) 5.18   (d) 1.59

19. Two rigid boxes containing different ideal gases are placed on table. Box A contains one moles of nitrogen at temperature T_0, while box B contains one mole of helium at temperature $(7/3)$ T_0. The boxes are then put into thermal contact with each other, and heat flows between them until the gases reach a common final temperature (ignore the heat capacity boxes). Then, the final temperature if the gases, T_f, in terms of T_0 is
(a) $T_f = \frac{3}{7} T_0$ (b) $T_f = \frac{3}{7} T_0$
(c) $T_f = \frac{3}{2} T_0$ (d) $T_f = \frac{5}{2} T_0$

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20. Consider the following two statements and choose the correct answer.

    (A) If heat is added to a system its temperature must always increase.

    (B) If positive work is done by a system in thermodynamic process, its volume must increase.

    (a) Both (A) and (B) are correct
    (b)(A) is correct, but (B) is wrong
    (c) (B) is correct, but (A) is wrong
    (d) Both (A) and (B) are wrong

21. **Assertion** Thermodynamic process in nature are irreversible

    Reason Dissipative effects cannot be eliminated.

    (a) Both assertion and reason are true and reason is the correct explanation of assertion

    (b) Both assertion and reason are true but reason is not the correct expansion of assertion

    (c) Assertion is true but reason is false

    (d) Both assertion and reason are false

22. Three samples of the same gas, X, Y and Z, for which the ratio of specific heat $\gamma = \dfrac{3}{2}$ have initially the same volume. The volumes of each sample is doubled, by adiabatic process in the case of X, by isobaric process in the case of Y and by isothermal process in the case of Z. If the initial pressures of the samples X, Y and Z are in the ratio $2\sqrt{2} : 1 : 2$ then the ration of their final pressures is

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

23. How much heat energy in joules must be supplied to 14 g nitrogen at room temperature to raise its temperature by 40°C at constant pressure?(Mol. wt. of N_2=28g, R = constant)
    (a) 50 R   (b) 60 R
    (c) 70 R   (d) 80 R

24. A given mass of a gas is compressed isothermally until its pressure is doubled, it is then allowed to expand adiabatically until its original volume is restored and its pressure is then found to be 0.75 of its initial pressure. The ratio of the specific heat of the gas is approximately
    (a) 1.20   (b) 1.41
    (c) 1.67   (d) 1.83

25. Two vessels A and B having equal volume contain equal masses of hydrogen in A and helium in B at 300 k. then, mark the correct statement.
    (a)The pressure exerted by hydrogen is half the exerted by helium.
    (b) The pressure exerted by hydrogen is equal to that exerted by helium.
    (c) Average KE of the molecules of hydrogen is half the average KE of the molecules of helium.
    (d) The pressure exerted by hydrogen is twice that exerted by helium.

26 A simple pendulum has a bob suspended by an inextensible thread of length I metre from a

point A of suspension. At the extreme position of oscillation, the thread is suddenly caught by a peg at a point

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B distant (1/4) m from A and the bob begins to oscillate in the new condition. Thechange in frequency of oscillation of the pendulum is approximately given by (g = 10 m/s^2)

(a) $\dfrac{\sqrt{10}}{2}$ hertz

(b) $\dfrac{1}{4\sqrt{10}}$ hertz

(c) $\dfrac{\sqrt{10}}{3}$ hertz

(d) $\dfrac{1}{\sqrt{10}}$ hertz

27. Two springs are connected to a block of mass M placed on a frictionless surface as shown below. If both the springsd have a spring constant k, the frequency of oscillation of the block is
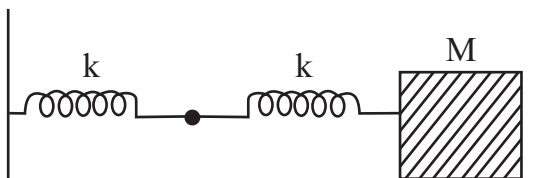

(a) $\dfrac{1}{2\pi}\sqrt{\dfrac{k}{M}}$

(b) $\dfrac{1.}{2\pi}\sqrt{\dfrac{k}{2M}}$

(c) $\dfrac{1}{2\pi}\sqrt{\dfrac{2k}{M}}$

(d) $\dfrac{1.}{2\pi}\sqrt{\dfrac{M}{k}}$

28. An earthquake generates both transverse (S) and longitudinal (P) sound waves in the earth. The speed of S waves is about 8.0 km/s. A seismograph records P and S waves from an earthquake. The first P wave arrives 4.0 min before the first S wave. The epicenter of the earthquake is located at a distance about
(a) 25 km
(b) 250 km
(c) 2500 km
(d) 5000 km

29. What is your observation when two source are emitting sound with frequency 499 Hz and 501 Hz?

(a) Frequency of 500 Hz is heard with change in intensity take place twice.
(b) Frequency of 500 Hz is heard with change in intensity take place once.
(c) Frequency of 2 Hz is heard with change in intensity take place once.
(d) Frequency of 2 Hz is heard with change in intensity take place twice.

30. An electric charge 10^{-3} µC is place at the origin (0, 0) of (x – y) co-ordinate system. Two points A and B are situated at (2, 2) and (2, 0) respectively. The potential difference between the point A and B will be
(a) 4.5 volt
(b) 9 volt
(c) Zero
(d) 2 volt

31. Seven capacitors each of capacitance 2µF are to be connected to obtain a capacitance of $\dfrac{10}{11}$ µF which of the following combination is possible?
(a) 5 in parallel, 2 in series
(b) 4 in parallel, 3 in series
(c) 3 in parallel, 4 in series
(d) 2 in parallel, 5 in series

32. The resistance between the terminal points A and B of the given infinitely log circuit will be

(a) $\sqrt{3}$-1Ω
(b) 1-$\sqrt{3}$ Ω
(c) 1+$\sqrt{3}$ Ω
(d) 2+$\sqrt{3}$ Ω.

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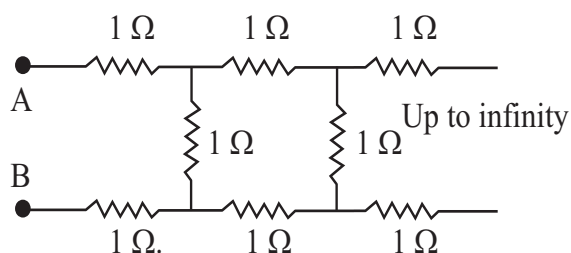
33. Two heater wires, made of the same material and having the same length and the same radius, are first connected in series and then in parallel to a constant potential difference. If the rate of heat produced in the two cases are H_s and H_p respectively, then H_s/H_p will be
(a) ½   (b) 2
(c) ¼   (d) 4

34. In the given circuit, the potential difference between A and B is
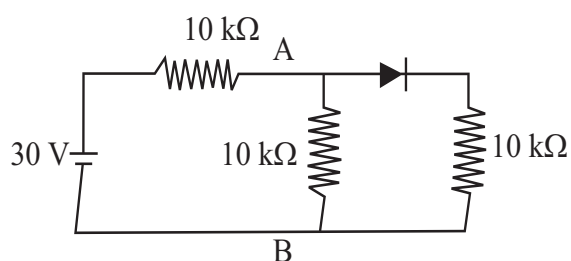
(a) 0   (b) 5 volt
(c) 10 volt   (d) 15 volt

35. In the circuit shown, current flowing through 25 V cell is
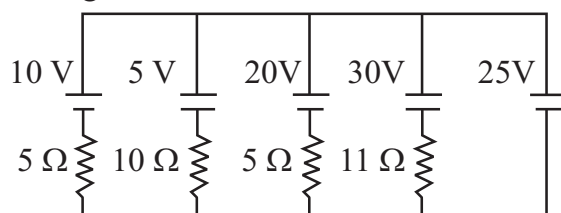
(a) 7.2 A   (b) 10 A
(c) 12 A   (d) 14.2 A

36. A battery is connected from two points A and B on the circumference of a uniform conducting ring of radius r and resistance R. One of the arcs AB of the ring subtends an angle θ at the centre. The value of the magnetic induction at the centre due to current in the ring is
(a) Proportional to $2(180° - \theta)$
(b) Inversely proportional to r
(c) Zero, only if $\theta = 180°$
(d) Zero for all values of θ

37. Two particles, each of mass m and charge q, are attached to the two ends of a light rigid rod of length 2R. The rod is rotated at constant angular speed about a perpendicular axis passing through its centre. The ratio of the magnitude of the magnetic moment of the system and its angular momentum about the centre of the radius of the rod is

(a) $\dfrac{q}{2m}$ (b) $\dfrac{q}{m}$

(c) $\dfrac{2q}{m}$ (d) $\dfrac{q}{\pi m}$

38. Two identical circular loops of metal wire are lying on a table without touching each other. Loop-A carries a current which increase with time. In response the loop-B
(a) remains stationary
(b) is attracted by the loop-A
(c) is repelled by the loop-A
(d) rotates about its CM, with CM fixed

39. A coil of wire having inductance and resistance has a conducting ring placed coaxially within it. The coil is connected to a battery at time $t = 0$, so that a time –dependent current $I_1(t)$ start following through the coil. If $I_2(t)$ is the current induced in the ring, and B(t) is the magnetic field at the axis of the coil due to $I_1(t)$, then as a function of time $(t > 0)$, the product $I_2(t) B(t)$

(a) increase with time
(b) decrease with time
(c) does not vary with time
(d) passes through a maximum

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40. A solenoid has inductance of 10 henry and a resistance of 2 ohm. It is connected to a 10 volt battery. How long will it take for the magnetic energy to reach ¼ of its maximum value?
(a) 3.466 sec   (b) 3.046 sec
(c) 3.646 sec   (d) 3.004 sec

41. An isosceles prism of angle 120° has a refreative index 1.44. Two parallel monochromatic rays enter the prism parallel to each other in air as shown. The rays emerge from the opposite faces
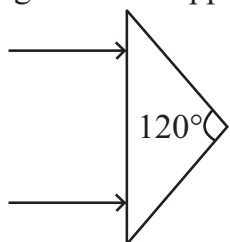
(a) are parallel to each other
(b) are diverging
(c) make an angle 2 [sin^{-1}(0.72-30)°] with each other
(d) make angle 2sin^{-1} (0.72) with each other

42. In a double slit experiment instead of taking slits of equal widths, one slit is made twice as wide as the other. Then, in the interference pattern
(a) the intensities of both the maxima and the minima increase
(b) the intensity of the maxima increase and the minima has zero intensity
(c) the intensity of the maxima decrease and that of the minima increase
(d) the intensity of the maxima decrease and the minima, a has zero intensity

43. Two beams of light having intensities I and 4I interference to produce a fringe pattern on a screen. The phase difference between the beams is $\pi/2$ at point A and π at point B. Then the difference between the resultant intensities at A and B is

(a) 2I   (b) 4I
(c) 5I   (d) 7I

44. Two thin convex lenses of focal lengths f_1 and f_2 are separated by horizontal distance d (where $d < f_1, d < f_2$) and their centres are displaced by a vertical separation Δ as shown in the fig.
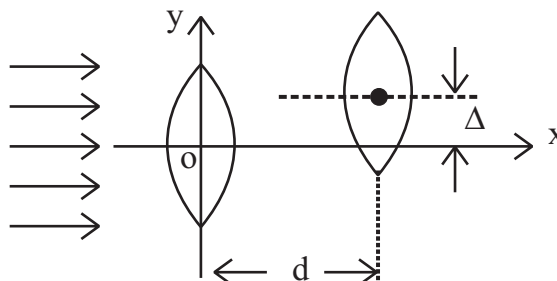
(a) $x = \dfrac{f_1 f_2}{f_1 + f_2}$, $y = \Delta$

(b) $x = \dfrac{f_1 (f_2 + d)}{f_1 + f_2 - d}$, $y = \dfrac{\Delta}{f_1 + f_2}$

(c) $x = \dfrac{f_1 f_2 + d(f_1 - d)}{f_1 + f_2 - d}$, $y = \dfrac{\Delta(f_1 - d)}{f_1 + f_2 - d}$

(d) $x = \dfrac{f_1 f_2 + d (f_1 - d)}{f_1 + f_2 - d}$, $y = 0$

45. A concave mirror is placed on a horizontal table, with its axis directed vertically upwards. Let o be the pole of the mirror and C its centre of curvature. A point object is placed at C. It has a real image, also located at C. If the mirror is now filled with water, the image will be.
(a) real, and will remain at C.
(b) real, and located at a point between C and ∞.
(c) virtual, and located at a point between C and O.
(d) real, and located at point between C and O.

46. In Young's experiment, the upper slits is covered by a thin glass plate of refractive index 1.4 while the lower slit is covered

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by another glass plate, having the same thickness as the first one but having refractive index 1.7. Interference pattern is observed using light of wavelength 5400 Å. It is found that the point P on the screen where the central maximum(n=0) fells before the glass plates were inserted now has ¾ the original intensity. It is further observed that what use to be the fifth maximum earlier, lies below the point P while the six minimum lies above P. Calculate the thickness of the glass of the plate. (Absorption of light by glass plate may be neglected.)

(a)9.3×10^{-6} (b)3.9×10^{-8}
(c)9.3×10^{-16} (d)3.9×10^{8}

47. A quarter cylinder of radius R and refractive index 1.5 is placed on a table A point object P is kept at a distance of mR from it. Find the value of m for which a ray from P will emerge parallel to the table as shown in Figure.
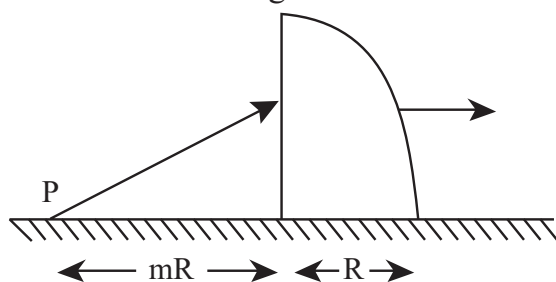
(a) 3/4   (b) 2/5
(c) 5/2   (d) 4/3

48. Two radioactive materials X_1 and X_2 have decay constants 10λ and λ respectively. If initially they have the same number of nuclei, then the ratio of the number of nuclei X_1 to that of X_2 will be 1/e after a time.

(a) $\dfrac{1}{10\lambda}$ (b)$\dfrac{1}{11\lambda}$

(c) $\dfrac{11}{10\lambda}$ (d) $\dfrac{1}{9\lambda}$

49. The half-life period of a radioactive element X is same as the mean-life time of another radioactive element Y. Initially both of them have has the same numbers of atoms. Then
(a) X and Y have the same decay rate initially
(b) X and Y have the same decay rate always
(c) Y will decay at a faster rate than X
(d) X will decay at a faster rate than Y

50. Electrons with energy 80 keV are incident of the tungsten target of an X-ray tube. K-shell electrons of tungsten have 72.5 ke V energy. X-rays emitted by the tube contain only
(a) a continuous X-ray spectrum (Bremsstrahlung) with a minimum wavelength of 0.155Å
(b) a continuous X-ray spectrum (Bremsstrahlung) with a minimum wavelength of all wavelengths
(c) the characteristic X-ray spectrum of tungsten.
(d) a continuous X-ray spectrum (Bremsstrahlung) with a minimum wavelength of 0.155Å and the characteristic X-ray spectrum of tungsten.

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CHEMISTRY

51. Number of atoms in 560 g of Fe (atomic mass 56 g mol^{-1}) is
    (a) twice that of 70 g N
    (b) half that of 20 g H
    (c) both are correct
    (d) none of these

52. The volume - temperature graphs of a given mass of an ideal gas at constant pressures are shown below. What is the correct order of pressures?
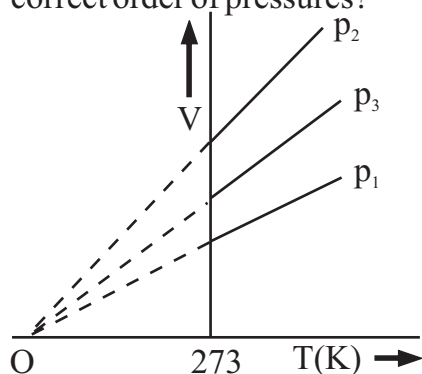
    (a) $p_1 > p_3 > p_2$ (b) $p_1 > p_2 > p_3$
   (c) $p_2 > p_3 > p_1$ (d) $p_2 > p_1 > p_3$

53. The rms speed of hydrogen is $\sqrt{7}$ times the rms speed of nitrogen. If T is the temperature of the gas. then
    (a) $T_{H_2} = T_{N_2}$ (b) $T_{H_2} > T_{N_2}$
    (c) $T_{H_2} < T_{N_2}$ (d) $T_{H_2} = \sqrt{7}T_{N_2}$

54. The energies, E_1 and E_2 of two radiation are 25 eV and respectively. The relation between their wavelengths i.e., λ_1 and λ_2 will be
    (a) $\lambda_1 = 1/2\ \lambda_2$ (b) $\lambda_1 = \lambda_2$
    (c) $\lambda_1 = 2\ \lambda_2$ (d) $\lambda_1 = 4\lambda_2$

55. Which of the following is not possible for 4p or 3d electrons?
    (a) n= 3, l=2, m= +1, s= +1/2
    (b) n= 4, l=1, m= 0, s= +1/2
    (c) n= 3, l=3, m= +3, s= +1/2
    (d) n= 4, l=1, m= -1, s= +1/2

56. Among of the following the pair in which the two species are not isostructural is
    (a) IO_3^- and XeO_3
    (b) PF_6^- and SF_6
    (c) BH_4^- and NH_4^+
   (d) CO_3^{2-} and NO_3^-

57. Which of the following compound has maximum volatility?
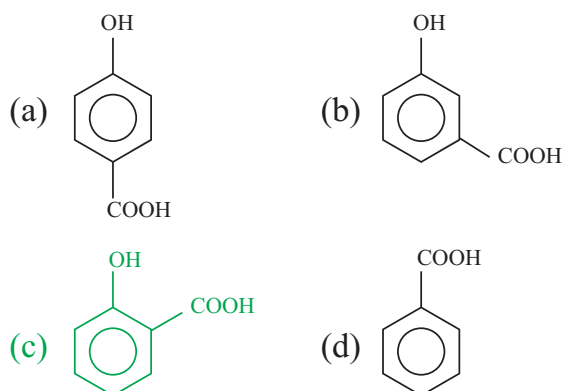
58. N_2 and O_2 are converted into N_2^+ and O_2^+ respectively. which of the following is not correct?
    (a) In N_2^+, the N—N bond weakens
    (b) In O_2^+, the O—O bond order increases
    (c) In O_2^+, paramagnetism decreases
    (d) N_2^+, becomes diamagentic

59. If C_p and C_v are the specific heat for a gas at constant pressure and at constant volume respectively, then the relation $C_p - C_v = R$ is exact for
    (a) Ideal gas and the nearly true for real gases at high pressure
    (b) Ideal and real gases at all pressures
    (c) Ideal gas and the nearly true for real gases at moderate pressure
   (d) Ideal gas at all pressure and real gas at moderate pressure.

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60. *n* moles of a monoatomic gas is carried round the reversible rectangular cycle ABCDA as shown in the diagram. The temperature at A is T_0
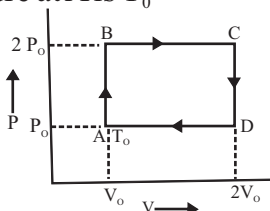
The thermodynamic efficiency of the cycle is
(a) 15 % (b) 50 %
(c) 20 % (d) 25 %

61. An ideal gas is taken through the cycle A→B→C→A, as shown in figure. If the net heat supplied to the gas in the cycle is 5 J the work done by the gas in the process A→B is
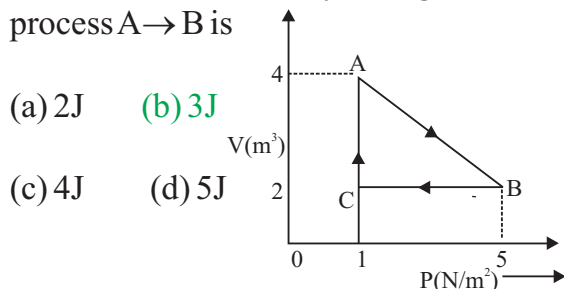
(a) 2J (b) 3J

(c) 4J (d) 5J

62. Which of the following azeotropic solutions has the boiling point less than boiling point of the constituents A and B?
(a) $CHCl_3$ and CH_3COCH_3
(b) CS_2 and CH_3COCH_3
(c) CH_3CH_2OH and CH_3COCH_3
(d) CH_3CHO and CS_2

63. 0.01 M solution of KCl and $BaCl_2$ are prepared in water. The freezing point of KCl is found to be -2°C. What is the freezing point of $BaCl_2$ to be completely ionized?
(a) -3°C (b) +3°C
(c) -2°C (d) -4°C

64. In chemical equilibrium, the value of Δn is negative, then the relationship between K_p and K_c will be
(a) $Kp = Kc$ (b) $Kp < Kc$
(c) $Kp > Kc$ (d) None of these

65. The solubility of CuBr is 2×10^{-4} mol/L at 25°C. The K_{sp} value of CuBr is
(a) 4×10^{-8} $mol^2 L^{-2}$
(b) 4×10^{-4} $mol^2 L^{-2}$
(c) 4×10^{-11} $mol^2 L^{-2}$
(d) 4×10^{-15} $mol^2 L^{-2}$

66. For the redox reaction,
$MnO_4^- + C_2O_4^{2-} + H^+ \rightarrow Mn^{2+} + CO_2 + H_2O$
The correct stoichiometric cofficients of $MnO_4^-, C_2O_4^{2-}$ and H^+ are
(a) 2, 5, 16 (b) 16, 5, 2
(c) 5, 16, 2 (d) 2, 16, 5

67. A first order reaction, which is 30 % complete in 30 minutes has a half life period of
(a) 102.2 min (b) 58.2 min
(c) 24.2 min (d) 120.2 min

68. The potential energy diagram for a reaction R→P is given in the figure. $\Delta H°$ of the reaction corresponds to the energy
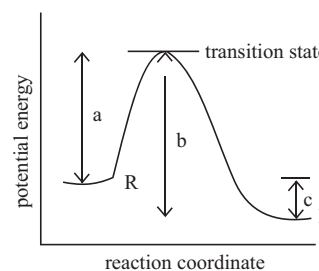
(a) a (b) b
(c) c (d) a+b

69. The first order reaction is carried out starting with 10 mol L^{-1} of the reactant. It is 40 % complete in one hour. If the same reaction is carried out with an initial

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concentration of 5 mol L^{-1}, the percentage of the reaction that is completed in one hour will be
(a) 40%   (b) 80%
(c) 20%   (d) 60%

70. Among the following, the surfactant that will form micelles in aqueous solution at the lowest molar concentration at ambient conditions is
(a) $CH_3 (CH_2)_{15}N^+(CH_3)_3Br^-$
(b) $CH_3 (CH_2)_{11}OSO_3^- Na^+$
(c) $CH_3 (CH_2)_6COO^-Na^+$
(d) $CH_3 (CH_2)_{11}N^+(CH_3)_3Br^-$

71. Among the electrolytes Na_2SO_4, $CaCl_2$, $Al_2(SO_4)_3$ and NH_4Cl, the most effective coagulating agent for Sb_2S_3 sol is...
(a) Na_2SO_4 (b) $CaCL_2$
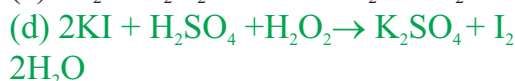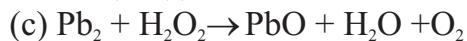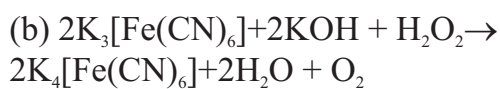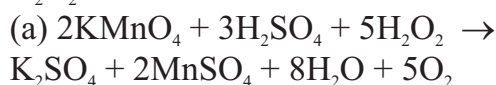(c) $Al_2(SO_4)_3$ (d) NH_4Cl

72. Na_2O, MgO, Al_2O_3 and SiO_2 have heat of formation equal to -416, -602, -1676, and -911 kJ mol^{-1} respectively. The most stable oxide is
(a) Na_2O (b) MgO
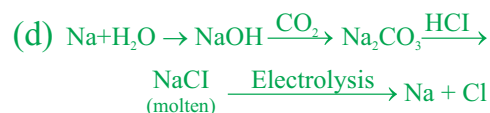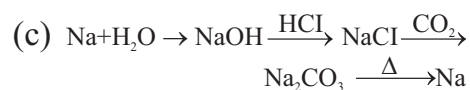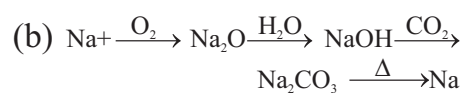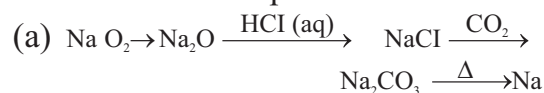(c) Al_2O_3 (d) SiO_2

73. One mole of the magnesium in the vapour state absorbed 1200 kJ mol^{-1} of energy. If the first and second ionization energies of Mg are 750 and 1450 kJ mol^{-1} respectively, the final composition of the mixture is
(a) 31% Mg^+ + 69% Mg^{2+}
(b) 69% Mg^+ + 31% Mg^{2+}
(c) 86% Mg^+ + 14% Mg^{2+}
(d) 14% Mg^+ + 86% Mg^{2+}

74. Which one of the following reactions represents the oxidising property of H_2O_2?
(a) $2KMnO_4 + 3H_2SO_4 + 5H_2O_2 \rightarrow$ $K_2SO_4 + 2MnSO_4 + 8H_2O + 5O_2$

(b) $2K_3[Fe(CN)_6]+2KOH + H_2O_2 \rightarrow$ $2K_4[Fe(CN)_6]+2H_2O + O_2$
(c) $Pb_2 + H_2O_2 \rightarrow PbO + H_2O + O_2$
(d) $2KI + H_2SO_4 + H_2O_2 \rightarrow K_2SO_4 + I_2$ $2H_2O$

75. Which sequence of reactions shwos correct chemical relation between sodium and its compounds?
(a) $Na\ O_2 \rightarrow Na_2O \xrightarrow{HCI\ (aq)} NaCI \xrightarrow{CO_2} Na_2CO_3 \xrightarrow{\Delta} Na$

(b) $Na+ \xrightarrow{O_2} Na_2O \xrightarrow{H_2O} NaOH \xrightarrow{CO_2} Na_2CO_3 \xrightarrow{\Delta} Na$

(c) $Na+H_2O \rightarrow NaOH \xrightarrow{HCI} NaCI \xrightarrow{CO_2} Na_2CO_3 \xrightarrow{\Delta} Na$

(d) $Na+H_2O \rightarrow NaOH \xrightarrow{CO_2} Na_2CO_3 \xrightarrow{HCI} NaCI \xrightarrow[(molten)]{Electrolysis} Na + Cl$

76. Aqueous solution of $Na_2S_2O_3$ on reaction with Cl_2 gives
(a) $Na_2S_4O_6$ (b) $NaHSO_4$
(c) $NaCl$ (d) $NaOH$

77 **Assertion** Barium is not required for normal biological function in human.
Reason Barium does not show variable oxidation state.
(a) Both Assertion and Reason are true and reason is the correct explanation Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false.
(d) Both Assertion and Reason are false.

78. **Assertion** Silica is soluble in HF.
    Reason $SiO_2 + 4HF \rightarrow SiF_4 + 2H_2O$
    $SiF_4 + 2HF \rightarrow H_2SiF_6$

    (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

    (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

    (c) Assertion is true but Reason is false.

    (d) Both Assertion and Reason are false.

79. **Assertion** Silicones are hydrophobic in nature.
    Reason Si—O—Si linkages are moisture sensitive.

    (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

    (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion.

    (c) Assertion is true but Reason is false.

    (d) Both Assertion and Reason are false.

80. A transition metal ' A ' has 'spin-only' magnetic moment value of 1.8 BM. When it is reacted with dilute sulphuric acid in the presence of air, a compound ' B ' is formed. ' B ' reacts with compound 'C' to give compound ' D 'with liberation of iodine. Then the metal A and compounds B, C and D are respectively
    (a) Ti, $TiSO_4$, KI and TiI_2
    (b) Zn, $ZnSO_4$, KI and Zn_2I_2
    (c) Cu, $CuSO_4$, KI and Cu_2I_2
    (d) Cu, $CuSO_4$, Cu_2I_2 and CuI_2

81. The actinoids exhibit more number of oxidation state in general then the lanthanoids. This is because
    (a) The $5f$- orbitals are more buried than the $4f$-orbiitals.
    (b) There is similar between $4f$ and $5f$- orbitals in their angular part of the wave function.
    (c) The actinoids are more reactive than the lanthanoids.
    (d) The $5f$-orbitals extend further from the nucleus than the $4f$-orbitals.

82. **Assertion** If β_4 for $[Cu(NH_3)_4]^{2+}$ is 2.1×10^{13}, its instability constant is 4.76×10^{-14}
    Reason overall dissociation equilibrium constant varies inversely with formation constant.

    (a) Both Assertion and Reason are true and the Reason is the correct explanation of Assertion.

    (b) Both Assertion and Reason are true and the Reason is not the correct explanation of Assertion.

    (c) Assertion is true but Reason is true is false.

    (d) Both Assertion and Reason are false.

83. Aluminium reacts with NaOH and forms compound ' X '. if the coordination number of aluminium in ' X ' is 6, the correct formula of X is

    (a) $[Al(H_2O)_4 (OH)_2]^+$
    (b) $[Al(H_2O)_3 (OH)_3]$
    (c) $[Al(H_2O)_2 (OH)_4]^-$
    (d) $[Al(H_2O)_6](OH)_3$

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84. Two isomers X and Y with the formula $Cr(H_2O)_5 ClBr_2$ were taken for the experiment on depression on freezing point. It was found that one mole of X gave depression corresponding to 2 moles of particles and one mole of Y gave depression due to 3 moles of particles. The structural formula of X and Y respectively, are
    (a) $[Cr(H_2O)_5Cl]Br_2; [Cr(H_2O)_4Br_2]Cl.H_2O$
    (b) $[Cr(H_2O)_5Cl]Br_2; [Cr(H_2O)_3ClBr_2.2H_2O]$
    (c) $[Cr(H_2O)_5 Br]BrCl ;[Cr(H_2O)_4ClBr]Br.H_2O$
    (d) $[Cr(H_2O)_4Br_2]ClH_2O;[Cr(H_2O)_5 Cl]Br_2$

85. Among the following complexes (K-P), $K_3[Fe(CN)_6]$ (K), $[Co(NH_3)_6]Cl_3$ (L), $Na_3[Co(ox)_3]$(M) $[Ni (H_2O)_6] Cl_2$(N), $K_2[Pt(CN)_4]$ (O) and $[Zn(H_2O)_6] (No_3)_2$ (P)the diamagnetic complexes are
    (a) K, L, M, N   (b) K, M, O, P
    (c) L, M, O, P   (d) L, M, N, O

86 Both Co^{+3} and Pt^{4+} have a coordination number of six. Which of the following pairs of complexes will show approximately the same electrical conductance for their 0.001 M aqueous solutions?
    (b) $CoCl_3 . 4NH_3$ and $PtCl_4 .4NH_3$
    (b) $CoCl_3 . 3NH_3$ and $PtCl_4 .5NH_3$
    (c) $CoCl_3 . 6NH_3$ and $PtCl_4 .5NH_3$
    (d) $CoCl_3 . 6NH_3$ and $PtCl_4 .3NH_3$

87. What are X and Y respectively in the following reaction?
    Z-product $\xleftarrow{y}$ 2-butyne $\xrightarrow{x}$ E-product

    (a) Na/NH_3(liq.)and $Pd/BaSO_4 + H_2$
    (b) Ni/140°C and $Pd/BaSO_4 + H_2$
    (c) Ni/140°C and Na/NH_3(liq.)
    (d) $Pd/BaSO_4 + H_2$ and Na/NH_3(liq.)

88. The dihalogen derivative ' X ' of a hydrocarbon with three carbon atoms reacts with alcoholic KOH and produces another hydrocarbon which forms as red precipitate with ammoniacal Cu_2Cl_2. 'X' gives an aldehydes on reaction with aqueous KOH. The compound 'X' is
    (a) 1, 3-dichloropropane
    (b) 1, 2-dichloropropane
    (c) 2, 2-dichloropropane
    (d) 1, 1-dichloropropane

89. $CH^3\!\!-\!\!CH = CH_2 + NOCl \rightarrow P$
    Identify the adduct

    (a) $CH_3\!\!-\!\!CH\!\!-\!\!CH_2$ with CI and NO substituents

    (b) $CH_3\!\!-\!\!CH\!\!-\!\!CH_2$ with NO and CI substituents

    (c) $CH_3\!\!-\!\!CH_2\!\!-\!\!CH$ with NO and CI substituents

    (d) $CH_2\!\!-\!\!CH_2\!\!-\!\!CH_2$ with NO and CI substituents

90. Gasoline with an octane number of 80 is equivalent in knocking characteristics to a mixture of heptane and iso-octane of the following composition
    (a) 20 % heptane + 80 % iso-octane
    (b) 90 % heptane + 10 % iso-octane
    (c) 80 % heptane + 20 % iso-octane
    (d) 10 % heptane + 90 % iso-octane

91. The structure of the compound formed, when nitrobenzene is reduced by lithium aluminium hydride ($LiAlH_4$) is
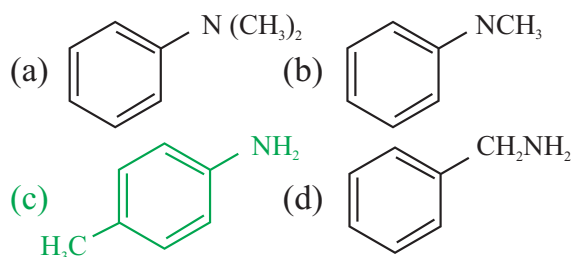
(a)

(b)

(c)

(d)
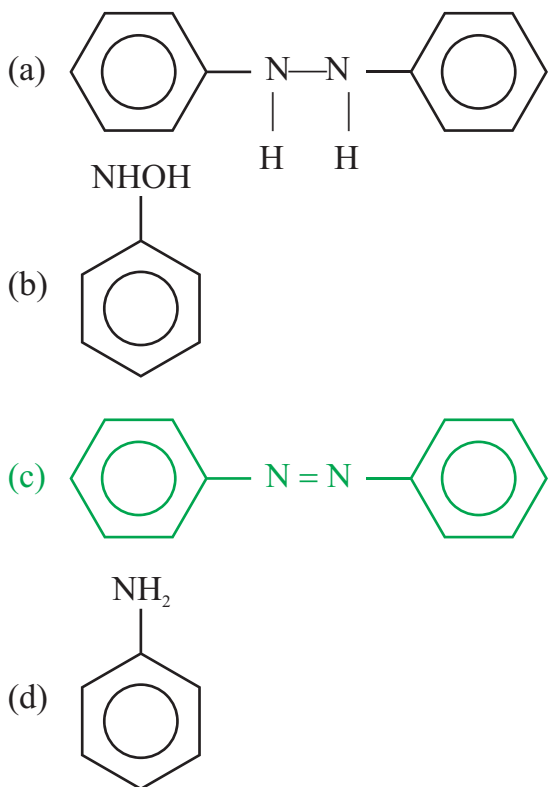
92. Which of the following reaction can produce aniline as main product?
(a) $C_6H_5NO_2$ + Zn / KOH
(b) $C_6H_5NO_2$ + Zn / NH_4Cl
(c) $C_6H_5NO_2$ + $LiAlH_4$
(d) $C_6H_5NO_2$ + Zn / HCl.

93. Amongst the compounds given the one that would from a brilliant coloured dye on treatment with $NaNO_2$ in dil. HCI followed by addition to an alkaline solution of β-naphthol is

(a)

(b)

(c)

(d)

94. Aniline is not the major product in one of the following reactions. Identify that reaction.

(a) C_6H_5OH + NH_3 $\xrightarrow{\text{Zncl}_2}{300°C}$

(b) $C_6H_5NO_2$ + ZN powder $\xrightarrow{\text{Alcoholic KOH}}$

(c) C_6H_5CI + NH_3 $\xrightarrow{200°C}{Cu_2O}$ high pressure

(d) $C_6H_5NO_2$ + 6 (H) $\xrightarrow{Fe+H_2O}{HCI}$

95. Arrange the following compounds in decreasing order of their boiling points.
CH_3CHO, CH_3CH_2OH, CH_3OCH_3, $CH_3CH_2CH_3$
(a) $CH_3CH_2CH_3 < CH_3OCH_3 < CH_3CHO < CH_3CH_2OH$
(b) $CH_3CH_2CH_3 < CH_3CHO < CH_3OCH_3 < CH_3CH_2OH$
(c) $CH_3CH_2CH_3 > CH_3CHO > CH_3OCH_3 > CH_3CH_2OH$
(d) $CH_3CH_2OH > CH_3CHO > CH_3OCH_3 > CH_3CH_2CH_3$
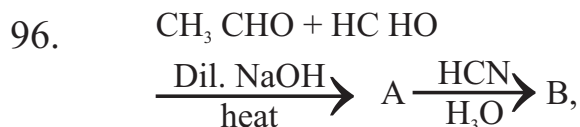
96. CH_3CHO + HC HO
$\xrightarrow[\text{heat}]{\text{Dil. NaOH}}$ A $\xrightarrow[H_3O]{HCN}$ B,
The structure of Compound B is

(a) CH_2=CH—CH—COOH
             |
             OH

(b) CH_2=CH—CH—OH
             |
             CN

(c) CH_3CH_2—CH—COOH
             |
             OH

(d) CH_3—CH—COOH
         |
         OH
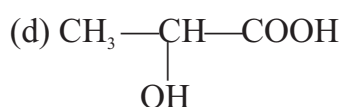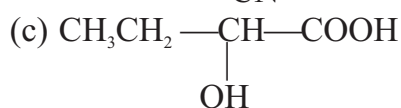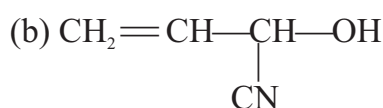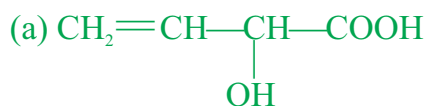
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97. $CH_3CO_2C_2H_5$ on reaction with sodium ethoxide in ethanol gives A, which on heating in the presenceof acid gives B. Compound B is

(a) CH_3COCH_2COOH

(c) $CH_2 =\!\!<\!\!\overset{O}{\diamond}\!\!>\!\!= O$

(b) CH_3COCH_3

(d) $CH_2 = C\!\!<\!\!\overset{OC_2H_5}{OC_2H_5}$
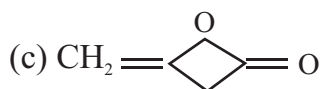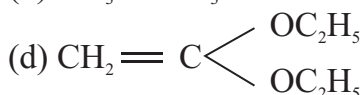
98. An organic compound 'X' with molecular formula, C_7H_8O is insoluble in aqueous $NaHCO_3$ but dissolves in NaOH. When treated with bromine water 'X' rapidly gives 'Y' $C_7H_5OBr_3$.
The compounds 'X' and 'Y' respectively, are
(a) benzyl alcohol and 2, 4, 6-tribromo-3-methoxy phenol benzene
(b) benzyl alcohol and 2, 4, 6-tribromo-3-methyl phenol.
(c) o-cresol and 3, 4, 5-tribromo-2-methyl phenol
(d) methoxybenzen and 2, 4, 6-3methoxy benzene.

99. At pH = 4, glycine exists as
(a) $H_3N\!-\!CH_2\!-\!COO^-$
(b) $H_3N\!-\!CH_2\!-\!COOH$
(c) $H_2N\!-\!CH_2\!-\!COOH$
(d) $H_2N\!-\!CH_2\!-\!COO^-$

100. Among cellulose poly (vinyl chloride), nylon and natural rubber, the polymer in which the intermolecular force of attraction is weakest in
(a) nylon
(b) poly (vinyl chloride)
(c) cellulose
(d) natural rubber .

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BIOLOGY

101. The fruit is chambered, developed from inferior ovary and has seeds with succulent testa in
(a) pomegranate (b) orange
(c) gauava (d) cucumber

102. The triploid number of chromosomes of the first taxon is 10 times more than the haploid number of chromosomes of the second taxon, while the diploid number of the third taxon is six time more than the haploid number of the fourth taxon. Which one of the following shows the ascending order of the number of chromosomes in their respective endosperm?
(a) Oryza —Allium—Saccharum—Nicotiana
(b) Allium —Oryza— Nicotiana—Saccharum
(c) Nicotiana —Saccharum—Oryza—Allium
(d) Saccharum —Oryza—Nicotiana—Allium

103. Floral formula $\oplus \overset{\circ}{\underset{+}{Q}} K_5 C_5 A_7 +_3 GI$ is of family
(a) Papilionaceae (b) Mimosoideae
(c) Caesalpinoidae (b) Malvaceae

104. Quiescent centre theory' was proposed by
(a) Nagelli (b) Schmidt
(c) Hanstein (b) Clowes

105. A nail is driven into the trunk of a 30 years old tree at a point I m above the soil level. The tree grows in height at the rate of 0.5m a year. After three years, nail will be
(a) 1 m above the soil
(b) 1.5 m above the soil
(c) 2 m above the soil
(d) 2.5 m above the soil

106. hnRNA undergoes two additional processing. Out of which, in one of them an unusual nucleotide (methyl guanosine triphosphate) is added to the 5`-end of hnRNA. This is known as
(a) capping (b) tailing
(c) splicing (d) termination

107. Assume that an actively respiring cell has 3x number of K^+ in its cytoplasm and 2x number of K^+ entered into the cell. What is the process by which K^+ transport has taken place?
(a) Primary active transport
(b) Secondary active transport
(c) Diffusion
(d) Passive transport

108. Sunken stomata is found in the leaves of
(a) Trifolium (b) Lemna
(c) Nerium (b) Lilium

109. The figure given below shows treee velocity substrate concentration curves for an enzyme reaction. What do the curves A, B and C depict respectively?
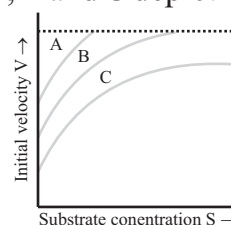
(a) A−normal enzyme reaction, B−competitive inhibition, C−non-competitive inhibition
(b) A−enzyme with an allosteric modulator added, B−normal enzyme activity, C−competitive inhibition
(c) A−enzyme with an allosteric stimulator, B−competitive inhibitor added, C−normal enzyme reaction
(d) A−ormal enzyme reaction, B−non-competitive inhibitor added, C−alosteric inhibitor added

110. Consider the following statement and choose the correct option
I. The endomembrane system include plasma membrane, ER Golgi complex, 1ysosomes and vacuoles
II. ER helps in the transport of substances, synthesis of proteins, lipoproteins and glycogen.
III. Ribosomes are involved in protein synthesis.
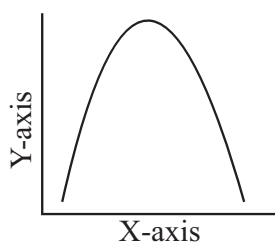IV. Mitochondria help in oxidative phosphorylation and generation of TP.
(a) II, III and IV are correct
(b) I is correct
(c) II is correct
(d) III is correct

111. The curve given below shows enzymatic activity with relation to three conditions (pH, temperature and substrate concentration) What do the two exes (X and Y) represent?

X-axis	Y-axis
(a) Temperature	— Enzyme activity
(b) Substrate concentration	— Enzyme activity
(c) Enzyme activity	— Temperature
(d) Enzyme activity	— pH

112. Three of the following statements regarding cell organelles are correct, while one is wrong. Which one is wrong?
(a) Lysosomes are double membraned vesicles budded off from Golgi apparatus and contain digestive enzymes
(b) Endoplasmic reticulum consists of a network of membranous tubule and helps in transport, synthesis and secretion

(c) Leucoplasts are bound by two membranes, lack pigment but contain their own DNA and protein synthesising machinery
(d) Sphaerosomes are single membrance bound and are associated with synthesis and storage of lipids

113. With reference to three Calvin cycles, which of the given options is correct for the following question?
I. How many gross PGAL molecules are produced?
II. Total, how many ATP molecules are required for synthesis of PGAL molecules?
III. Total, how many $NADPH_2$ molecules are required for the synthesis of obtained PGAL molecules?
(a) I—3 PGAL, II—3 ATP, III—3 $NADPH_2$
(b) 1—6 GPAI, II—6 ATP, III—6 $NADPH_2$
(c) 1—18 PGAL, II—18 ATP, III—18 $NADPH_2$
(d) 1—9 GPAL, II—9 ATP, III—9 $NADPH_2$

114. Malic acid (4-C) is produced in which plan without Kranz anatomy?
(a) Bryophyllum   (b) Kalanchoe
(c) Opunitia   (d) All of these

115. Chemiosmosis hypothesis given by Peter Mitchell proposes the machanism of
(a) synthesis of NADH
(b) synthesis of ATP
(c) synthesis of $FADH_2$
(d) synthesis of NADPH

116. Which of the PGR_6 induces parthenocarpy in tomatoes?
(a) Auxin   (b) Gibberellin
(c) Cytokinin   (d) Ethylene

117. 6-furfury1 amino purine, 2-4 dichlorophenoxy acetic acid and indole-3 acetic acid are examples respectively for
(a) natural suxin, gibberellin and kinetin
(b) kinetin, synthetic auxin and natural suxin
(c) synthetic auxin, kinetin and natural auxin
(d) natural suxin, kinetin and synthetic auxin

118. Match the items in column I with column II and choose the correct answer.

Column I	Column II
A. Phototaxis	1. Circular movement of protoplasmwith response to warm condition.
B. Thermotaxis	2. Downward movement of floral organs (closing flower)
C. Chemotaxis	3. Downward movement of leaf (drooping lear).
D. Hyponasy	4. Movement of anthrozoids towards archegonia
E. Seismonasty	5. Movement of chlamydomonas

	A	B	C	D	E
(a)	5	1	4	2	3
(b)	4	5	1	2	3
(c)	2	3	4	5	1
(d)	2	5	1	4	3

119. The back flow of faecel matter in the large intestine is prevented by the presence of
(a) epiglottis
(b) sphincter of Oddi
(c) ileo-caecal valve
(d) gastruc-oesophageal sphincter

120. Note the follwoing
I. Dentition is heterodont.
II. Canines are poorly developed.
III. Incisors ae chisel-like and poorly developed.
IV. Herbivouous and diastema is present.
V. The dental formula is 12/1, C 0/0, Pm 3/2, M 3/3 Which of the above are true for Oryctolagus?
(a) I, II and IV   (b) I, IV and V
(c) I, II, IV and IV   (d) III, IV and V

121. The diagram below shwos how things get to and from the liver. They are labelled as A, B, C, D, E and F. Which one of the following labellings is the correct one?
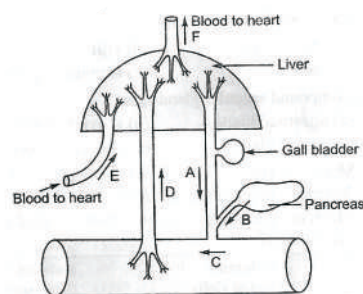
(a) A is the hepatic portal vein and E is the hepatic vein
(b) C is the intestine and F is the hepatic portal vein
(c) D is the hepatic portal vein and F is the hepatic vein
(d) D is the hepatic portal vein and E is the hepatic vein

122. Treatment with alloxan destroys
(a) STH cells
(b) alpha dells of islets of Langerhans
(c) beta cells of islets of Langerhans
(d) dells of Leydig

123. 72 beats per minute heart beat rate of man is controlled by
(a) SA-node   (b) ventricles
(c) Purkinje fibres   (b) A V-node

124. When does glomerular filtraion occurs in Bowman's capsule?
(a) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -25 mm Hg
(b) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -35 mm Hg
(c) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -10 mm Hg
(d) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -70 mm Hg

125. Hollw bones are characteristic of
(a) reptiles   (b) brids
(c) mammals   (d) fishes

126. Which of the following is the part of midbrain of rabbit?
(a) Diencephalon
(b) Cerebrum
(c) Corpora quadrigemi
(d) Corpora quadrigemina

127. Which one of the following four glands is correctly matched with the accompanying description?
(a) Thyroid   — Hyperactivity in young children causes cretinism
(b) Thymus   — Starts undergoing atrophy after puberty
(c) Parathyroid   — Secretes parathormone, which pormotes movement of calcium ions from blood into bones during calcification
(d) Pancreas   — Delta cells of the islets of Langerhans secrete a hormove, which stimulates glycolysis in liver

128.
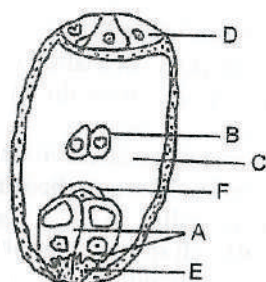
In the given diagram, parts labeled as A, B, C, D, E and F are respectively identified as
(a) egg, synergids, central cell, filiform apparatus, antipodals and polar nuclei
(b) polar nuclei, egg, antipodals, central cell, filiform apparatus and synergids
(c) synergids, polar nuclei, central cell, entipodals, filiform apparatus and egg
(d) central cell, polar nuclei filiform apparatus, antipodals, synergids and egg

129. Choose the correct combination of labelling of seminiferous tubules of testis.
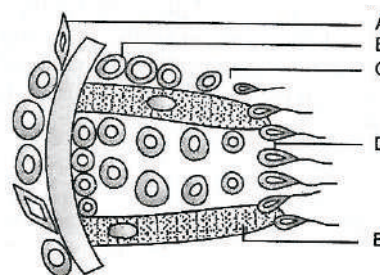
(a) A—Sertoli's cell
    B—Spermatogonium
    C—Spermatid
    D—Interstitial cell
    E—Spermatozoa
(b) A—Interstitial cell
    B— Spermatid
    C—Spermatogonium
    D—Spermatozoa
    E—Sertoli's cell
(c) A—Interstitial cell
    B—Spermatid
    C—Spermatozoa
    D—Spermatogonium
    E—Sertoli's cell
(d) A—Interstitial cell
    B—Spermatogonium
    C—Spermatid
    D—Spermatozoa
    E—Sertoli's cell

130. After examining the blood groups of husband and wife, the doctor advised them not to have more than one child, the blood group of the couple are likely to be
(a) male Rh^- and female Rh^+
(b) female Rh^- and male Rh^+
(c) male and female Rh^+
(d) male and female Rh^-

131. Which of the following is generally used for induced mutagenesis in crop plants ?
(a) Alpha particles
(b) X-rays
(c) UV (260 nm)
(d) Gamma rays (from cobald 60)

132. The sequence of nitrongen bases in a particular region of the non-conding strand of a DNA molecule was found to be CAT GTT TAT CGC. What would be the sequence of nitrogen bases in the mRNA that is synthesized the corresponding region of the couding strand in that DNA?
    (a) GUA CAA AUA GCC
    (b) GTA CAA ATA GCC
    (c) CAU GUU UAU CGC
    (d) CAA GAA TAU GCC

133. Age of fossils in the past was generally determined by radio-carbon method and other mehods involving radioactive elements found in the rocks. More precise mehods, which were used recently and led to the revision of the evolutionary period for different groups of organimsm, include
    (a) study of carbohydrates/proteins in fossils
    (b) study of condition of fossilization
    (c) electron spin resonance (ESR) and fossil DNA
    (d) study of carbohydrates/proteins in rocks

134. Hoolock gibbon (india' only ape) is found in
    (a) Kaziranga bird sanctuary
    (b) Hazaribagh national park
    (c) Corbett national park
    (d) Gir national park

135. Uniparous, biparous and multiparous systems of branching are found respectively in
    (a) Mirabilis, Datura and vine
    (b) Saraca, Mirabilis and Euphorbia
    (c) vine, Polyalthia and Saraca
    (d) Casuarina, Saraca and Croton

136. Read the following paragraph.
    An insect whose mouthparts are biting and chewing type in the larval condition. while they are spihoning type in the adult and this insect gives an economically important substance during yet another stage of its development.
    The insect is
    (a) Anopheles   (b) Laccifer
    (c) Bombyx   (b) Apis

137. The enteronephric nephridia in Pheretima consists which of the following parts given below?
    I. A nephrostome
    II. Terminal nephridial duct
    III. Septal excretory canal
    IV. Supra intestinal excretory canal
    V. Long thick walled excretory canal
    (a) II, V   (b) I, III, IV, V
    (a) III, IV, V   (d) I, III, IV

138. In earthworm, gizzard is fund, in which of the folowing segments?
    (a) 9th segment   (b) 18th segment
    (a) 13th segment   (b) 16th segment

139. Which of the following is known as pond silk?
    (a) Spirogyra   (b) Ulothrix
    (c) Nostoc   (b) Anabaena

140. Name the fungus that is edible.
    (a) Penicillium   (b) Mucor
    (c) Rhizopus   (d) Morchella

    Instruction for Q. No. **141** to **150**
    Each of the questions given below consists of two statements, an assertions (A) and reason (R) Encircle the number corresponding to the appropriate response in the answer sheet as follows.
    (a) If both assertion and reason are true and the reason is a correct explanation of the assertion
    (b) if both assertion and reason are true but the reason is not a correct explanation of the assertion
    (c) If the assertion is true, but the reason is false
    (d) if both assertion and reason are false

141. **Assertion :** Arboviruses are transmitted by animals.
Reason : They have single stranded DNA genome.

142. **Assertion :** A cholera patient is given glucose, electrolytes and water.
Reason : These plasmolyse the disease causing germs.

143. **Assertion :** Planst posseessing C_4-pathway of carbon fixation have a higher net primary productivity than the C_3-pathway possessing plants.
Reason : For each unit weight of fixed carbon, C_4-pathway possessing plantsrequire less water then the C_3-pthway possessing plants.

144. **Assertion :** 'Lac Operon Model's is applicable only to E.coli.
Reason : E. coli. lacks a definite nucleus.

145. **Assertion :** Senescence is the time when age associated defects are manifested.
Reason : Certain genes may be undergoing sequential switching on and off during one's life

146. **Assertion :** Rhoeo leaves contain anthocyanin pigments in epidermal cells.
Reason : Anthocyanins are accessory photo synthetic pigments

147. **Assertion :** Among the primates, chimpanzee is the closet relative of the present day humans.
Reason : The banding pattern in the autosome numbers 3 and 6 of man and chimpanzee is remarkably similar.

148. **Assertion :** DNA fingerprinting involves identifying differences in some specific regions in DNA sequence.
Reason : In repetitive DNA sequences, a small stretch of DNA is repeated many times.

149. **Assertion :** Only a single functional female gamete is formed from each primary oocyte cell.
Reason : Meiosis in each primary oocyte gives rise to only one cell which functions as ovum.

150. **Assertion :** Pearl is formed when a foreign particles gets in between shell and mantle.
Reason : The inner nacreous layer called mother of pearl is formed of layers of $CaCo_3$ and concholin

Q. No. 141 TO 150
ANSWER

141. (d)
142. (c)
143. (c)
144. (b)
145. (a)
146. (c)
147. (a)
148. (a)
149. (c)
150. (a)

ENGLISH PROFICIENCY & LOGICAL REASONING

Directions (Q. 151-153) Study the information carefully to answer these questions.

In a team, there are 240 members (males and females). Two-thirds of them are males. Fifteen per cent of males are graduates. Remaining males are non-graduates. Three-fourths of the females are graduates. Remaining females are non-graduates.

151. What is the difference between the number of females who are non-graduates and the number of males who are graduates?
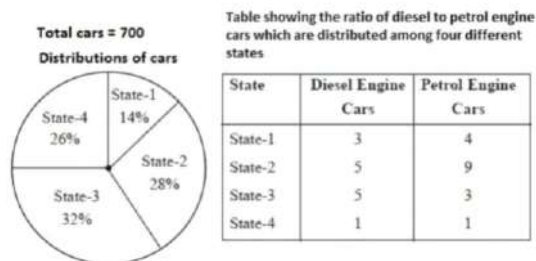(a) 2   (b) 116
(c) 4   (d) 36

152. What is the sum of the number of females who are graduates and the number of males who are non-graduates?
(a) 184   (b) 96
(c) 156   (d) 196

153. What is the ratio of the total number of males to the number of females who are non-graduates?
(a) 6:1   (b) 8:1
(c) 5:2   (d) 8:3

Directions (Q. 154-157): Study the following pie-chart and table carefully to answer the questions that follow:

Total cars = 700
Distributions of cars

State-1 14%
State-2 28%
State-3 32%
State-4 26%

Table showing the ratio of diesel to petrol engine cars which are distributed among four different states

State	Diesel Engine Cars	Petrol Engine Cars
State-1	3	4
State-2	5	9
State-3	5	3
State-4	1	1

154. What is the difference between the number of diesel engine cars in State-2 and the number of petrol engine cars in State-4?
(a) 159   (b) 21
(c) 28   (d) 34

155. The number of petrol engine cars in State-3 is what per cent more than the number of diesel engine cars in State-1?
(a) 100   (b) 125
(c) 200   (d) 225

156. If 95% of diesel engine cars in State-3 are AC and the remaining cars are non- AC, what is the number of diesel engine cars in State-3 which are non-AC?
(a) 75   (b) 45
(c) 95   (d) 105

157. What is the average number of petrol engine cars in all the states together?
(a) 86.75   (b) 89.25
(c) 89.75   (d) 86.25

158. Among A, B, C, D and E each having different weight, D is heavier than only A and C is lighter than B and E. Who among them is the heaviest?
(a) B   (b) E
(c) C   (d) Data inadequate

Directions (Q. 159 - 162): Read the information carefully and answer the following questions:
If A + B means A is the father of B.
If A - B means A is the sister of B
If A $ B means A is the wife of B.
If A % B means A is the mother of B.
If A * B means A is the son of B.

159. What should come in place of question mark to establish that J is brother of T in the expression?
  J * P % H ? T % L
(a) -   (b) *
(c) $ (d) Either * or -

160. Which of the given expressions indicates that M is daughter of D?

(a) L % R $ D + T - M
(b) L + R $ D + M - T
(c) L % R % D + T * M
(d) D + L $ R + M - T

161. Which of the following options is true if the expression 'I + T % J - L * K' is definitely true?
(a) L is daughter of T
(b) K is son-in-law of I
(c) I is grandmother of L
(d) T is father of J

162. Which of the following expressions is true if Y is son of X is definitely false?
(a) W % L - T - Y * X
(b) W + L - T - Y * X
(c) X + L - T - Y * W
(d) W $ X + L + Y + T

Directions (Q. 163 - 166): Study the following information and answer the questions given below:
Eight people - E, F, G, H, J, K, L and M - are sitting around a circular table, facing the center. Each of them is of a different profession - Chartered Accountant, Columnist, Doctor, Engineer, Financial Analyst, Lawyer, Professor and Scientist, but not necessarily in the same order. F is sitting second to the left of K. The Scientist is an immediate neighbor of K. There are only three people between the Scientist and E. Only one person sits between the Engineer and E. The Columnist is on the immediate right of the Engineer. M is second to the right of K. H is the Scientist. G and J are immediate neighbors of each other. Neither G nor J is an Engineer. The Financial Analyst is on the immediate left of F. The Lawyer is second to the right of the Columnist. The Professor is an immediate neighbor of the Engineer. G is second to the right of the Chartered Accountant.

163. Who is sitting second to the right of E?

(a) The Lawyer   (b) G
(c) The Engineer   (d) F

164. Who among the following is the Professor?
(a) F   (b) L
(c) M   (d) K

165. What is the position of L with respect to the Scientist?
(a) Third to the left
(b) Second to the right
(c) Second to the left
(d) Third to the right

166. Which of the following statements is true according to the given arrangement?
(a) The Lawyer is second to the left of the Doctor.
(b) E is an immediate neighbour of the financial Analyst.
(c) H sits exactly between F and the Financial Analyst.
(d) Only four people sit between the Columnist and F.

167. Which among the following Vedic Texts gives a systematic exposition of the 'theory of rebirth' for the first time?
(a) Chhandogya Upanishad
(b) Mundaka Upanishad
(c) Satapatha Brahmana
(d) Brihadaranyaka Upanishad

168. Which among the following is considered to be the official law book of the Guptas?
(a) Manusmriti
(b) Parashara Smriti
(c) Yajnavalkya Smriti
(d) Vyasa Smriti

169. What was the name of the silver coins issued by Guptas?
(a) Karshapana   (b) Rupaka
(c) Dinara   (d) Pana

170. Who among the following was the religious guru of Shivaji?
(a) Tukaram
(b) Eknath
(c) Jnaneshwar
(d) Ram Das

171. Which legendary Sufi saint of Chishti order was popularly known as 'Chirag-e-Dehlavi (Chirag of Delhi)'?
(a) Nizamuddin Auliya
(b) Shaikh Nasiruddin Mahmud
(c) Qutbuddin Bakhtiyar Khaki
(d) None of the above

172. The word "Hindu" with reference to the People of India was first used by which among the following?
(a) Greeks
(b) Romans
(c) Afghans
(d) Arabs

173. Astapradan was a council of Minister of which among the following ?
(a) Gupta Administration
(b) Chola Administration
(c) Maratha Administration
(d) Rajput administration

174. Which among the following Mughal Emperor was also known as "Ali Gauhar"?
(a) Bahadur Shah Zafar
(b) Shah Aalam II
(c) Muhammad shah
(d) Aurangzeb

175. Which of the following is the highest peak of Satpura Range?
(a) Gurushikhar
(b) Dhupgarh
(c) Pachmarhi
(d) Mahendragiri

176. The land frontier of India is about 15200 KM. Which of the following countries shares the largest border length with India:
(a) Bangladesh
(b) Pakistan
(c) china
(d) Nepal

177. The famous hill-station 'Kodaikanal' lies in :
(a) Nilgiri hills
(b) Palani hills
(c) Cardamom hills
(d) Javadi hills

178. "Hopman cup" is related to which sports?
(a) Football
(b) Lawn Tennis
(c) Badminton
(d) Cricket

179. The 2017 FIFA U-17 World Cup hosted by which country?
(a) India
(b) France
(c) Sri Lanka
(d) Vietnam

180. The World Tuberculosis Day is observed on which date?
(a) February 10
(b) March 24
(c) March 28
(d) April 5

Instruction for Q. No. 181 to 190. Pick up the correct synonyms for each of the following words.

181. DISTINGUISH
(a) Darken
(b) Abolish
(c) Differentiate
(d) Confuse

182. UNIFORMITY
(a) Routine
(b) Continuity
(c) Stability
(d) Consistency

183. SUPERCILIOUS
(a) Indifferent
(b) Annoyed
(c) Haughty
(d) Angry

184. HANDSOME
(a) Noble
(b) Gentle
(c) Good-looking
(d) Polite

185. DYNAMIC
(a) Vigorous
(b) Forceful
(c) Robust
(d) Active

186. ALERT
(a) Smart
(b) Active
(c) Watchful
(d) Live

SPACE FOR ROUGH WORK

187. IDENTIFY
(a)Picture   (b)Envision
(c)Notice   (d)Recognize

188. PREROGATIVE
(a)Privilege   (b)Request
(c)Desire   (d) Command

189. SYNTHETIC
(a) Scientific   (b) Fake
(c) Artificial   (d) Superficial

190. AMBITION
(a)Plan   (b)Proclamation
(c)Desire   (d)Decision

Instruction for Q. No. 191 to 200. Pick out the most effective word from the given word to fill in the blank to make the sentence meaning fully complete.

191. Some people….themselves into believing that they are indispensable to the organisation they work for.
(a)keep   (b)fool
(c)denigrate   (d)delude

192. His interest in the study of human behavior is indeed very ………..
(a)strong   (b)large
(c)broad   (d)deep

193. The improvement made by changes in the system was ……………and did not warrant the large expenses
(a)large   (b)small
(c)minute   (d) marginal

194. There has been a ………..lack of efficiency in all the crucial areas of the working of public sector undertakings.
(a)positive   (b) surprising
(c)conspicuous   (d) simulative

195. Two of the fugitives managed to remain free by adeptly avoiding the…..of the police
(a) torture   (b) pursuit
(c) discovery   (d) following

196. Man power is the…………means of converting other resources to mankind's use and benefit
(a)insuperable   (b)inimitable
(c)indivisible   (d)indispensable

197. Rights ………… automatically to him who duly performs his duties
(a)belong   (b) transfer
(c)accrue   (d) acquire

198. How much did it ………. To reach Bombay by car?
(a)charge   (b)price
(c)cost   (d)estimate

199. Ever one should ……. himself again illness since medical care has now become expensive.
(a) vaccinate   (b) insure
(c) brace   (d) ensure

200. The teacher ordered kamal to leave the room and ……..him to return.
(a) stopped   (b) refused
(c) forbade   (d) challenged

SPACE FOR ROUGH WORK