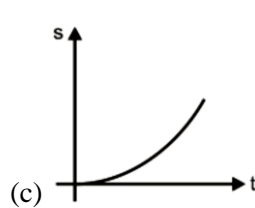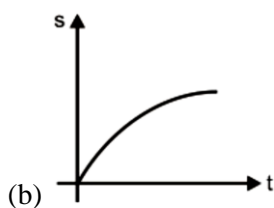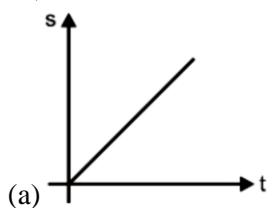1. One stone is dropped from a tower from rest and simultaneously another stone is projected vertically upwards from the tower with some initial velocity. The graph of the distance(s) between the two stones varies with time (t) as (before either stone hits the ground)

(a)   (b)   (c)   (d)
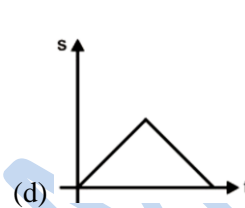
2. The tension in a wire is decreased by 19%. The percentage decrease in frequency will be
   (a) 19%   (b) 10 %   (c) 0.19 %   (d) None of these

3. A vessel contains oil (density 0.9 g cc$^{-(a)}$ over mercury (density 13.6 cc$^{-(a)}$. A homogeneous sphere floats with one – third of its volume immersed in mercury and the rest immersed in oil. The density of the material of the sphere in g cc^{-1} is
   (a) 3.3   (b) 6.4   (c) 5.1   (d) 12.8

4. Two men with weights in the ratio 4 : 3 run up a staircase in time in the ratio 12 : 11. The ratio of the power of the first to that of second is
   (a) $\dfrac{4}{3}$ (b) $\dfrac{12}{11}$ (c) $\dfrac{48}{33}$ (d) $\dfrac{11}{9}$

5. The diameter of the lens of a telescope is 0.61 m and the wavelength of light used is 5000A^0. The resolution power of the telescope is
   (a) 2×10^6 (b) 10^6 (c) 2×10^4 (d) 2×10^2

6. The magnetic field on the axis at a distance z from the centre of the bar magnet would be?

   (a) In the direction of the magnetic dipole moment $\left(\overrightarrow{M}\right)$ of the magnet.

   (b) In the opposite direction of the magnetic dipole moment $\left(\overrightarrow{M}\right)$ of the magnet.

   (c) In the perpendicular direction of the magnetic moment $\left(\overrightarrow{M}\right)$ of the magnet.

   (d) Its direction depends on the magnitude of the magnetic moment $\left(\overrightarrow{M}\right)$ of the magnet.

7. Sound waves are emitted uniformly in ali directions from a point source. The dependance of sound level β in decibels on the distance r can be expressed as (a and b are positive constants)
   (a) β =-b logr^a (b) β=a-b(log r)^2 (c) β= a - b log r   (d) β= a – b/r^2

8. An observer moves towards a stationary source of sound with a speed $\dfrac{1}{5}^{th}$ of speed of sound. The wavelength and frequency of the source emitted are λ and f respectively. The apparent frequency and wavelength recorded by the observer are respectively.
   (a) $1.2f,1.2\lambda$ (b) $1.2f,\lambda$ (c) $f,1.2\lambda$ (d) $0.8f,0.8\lambda$

9. A disc initially at rest, is rotated about its axis with uniform angular acceleration. In the first 2 s, it rotates an angle θ. In the next 2s, the disc rotates through an angle
   (a) θ (b) 2θ (c) 3θ (d) 4θ

Space for rough work

10. From an inclined plane, two particles are projected with the same speed at same angle θ, one up and other down the plane as shown in the figure. Which of the following statement(s) is/are correct?
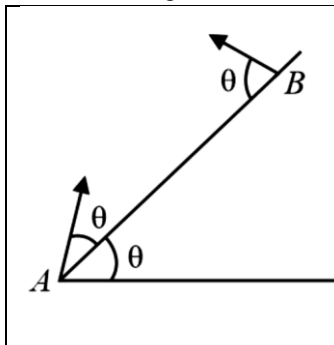
(a) The time of flight of each particle is the same.

(b) The particles will collide the plane with same speed.

(c) Both the particles strike the plane perpendicularly

(d) The particles will collide in mid air if projected simultaneously and time of flight of each particle is less than the time of collision.

11. A30 V, 90 W lamp is to be operated on a 120 V DC line. For proper glow, a resistor of ____ Ω should be connected in series with the lamp.

    (a) 40   (b) 10   (c) 20   (d) 30

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

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

13. When both the listener and source are moving towards each other, then which of the following is true regarding frequency and wavelength of wave observed by the observer?

    (a) More frequency, less wavelength   (b) More frequency, more wavelength

    (c) Less frequency, less wavelength   (d) More frequency, constant wavelength

14. A vessel contains 1g of oxygen at a pressure of 10 atm and a temperature of 47^{0}C. It is found that because of a leak, the pressure drops to $\dfrac{5^{th}}{8}$ of its original value and the temperature falls to 27^{0}C. Find the mass of oxygen that is leaked out.

   (a) $\dfrac{1}{3}g$ (b) $\dfrac{1}{48}g$ (c) 1 g   (d) $\dfrac{2}{3}g$

15. A particle of mass *m* is fixed to one end of a light spring of force constant *k* and unstretched length *l*. The system is rotated about the order end of the spring with an angular velocity ω, in gravity free space. Then increase in length of the spring will be:

    (a) $\dfrac{m\omega^2 l}{k}$ (b) $\dfrac{m\omega^2 l}{k - m\omega^2}$ (c) $\dfrac{m\omega^2 l}{k + m\omega^2}$ (d) None of these

16. A heavy uniform chain lies on a horizontal table top. If the coefficient of friction between the chain and the table surface is 0.25, then the maximum fraction of the length of the chain that can hang over one edge of the table is

    (a) 20%   (b) 25 %   (c) 35%   (d) 15%

17. There are two identical small holes of area of cross – sectional A on the opposite sides of a tank containing a liquid of density ρ. The difference in height between the holes is *h*. Tank is resting on a smooth horizontal surface, horizontal force which has to be applied on the tank to keep it in equilibrium is
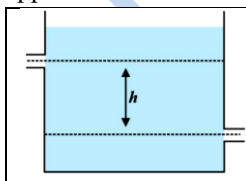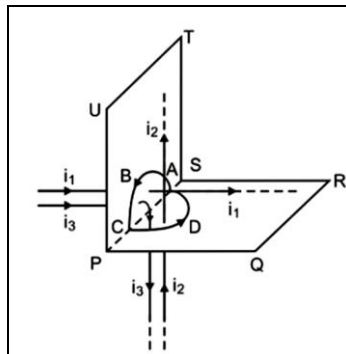

(a) ρghA (b) $2gh/\rho A$

(c) $2\rho ghA$ (d) $\rho gh/A$

Space for rough work

18. Figure shows an amperian path ABCDA. Part ABC is in vertical plane PSTU while part CDA is in horizontal plane PQRS. Direction of circulation along the path is shown by an arrow near point B and at D. $\oint \vec{B}.d\vec{l}$ for this path according to Ampere's law will be

(a) $\left(i_1 - i_2 + i_3\right)\mu_0$
(b) $\left(-i_1 + i_2\right)\mu_0$
(c) $i_3\mu_0$
(d) $\left(i_1 + i_2\right)\mu_0$

19. The period of a simple pendulum inside a stationary lift is T. The lift accelerates upwards with an acceleration of g/3. The time period of pendulum will be

(a) $\sqrt{2}T$ (b) $\dfrac{T}{\sqrt{2}}$ (c) $\dfrac{\sqrt{3}}{2}T$ (d) $\dfrac{T}{3}$

20. In the thermodynamical process, pressure of a fixed mass of gas, is changed in such a manner that the gas releases 20J of heat and 8J of work is done on the gas. If internal energy of the gas was 30J, then the final internal energy will be

(a) 42 J (b) 18 J (c) 12 J (d) 60 J

21. The flux associated with a coil changes from 1.35 Wb to 0.79 Wb within $\dfrac{1}{10}s$. Then the charge which flows in the coil, if resistance of coil is 7Ω is

(a) 0.08 C (b) 0.8 C (c) 0.008 C (d) 8 C

22. Torque of equal magnitude is applied to a solid cylinder and a solid sphere, both having the same mass and radius. Both of them are free to rotate about their axis of symmetry. If α_1 and α_2 are the angular accelerations of the cylinder and the sphere respectively then the ratio $\dfrac{\alpha_1}{\alpha_2}$ will be

(a) $\dfrac{5}{2}$ (b) $\dfrac{5}{4}$ (c) $\dfrac{4}{5}$ (d) $\dfrac{2}{5}$

23. A, B, C and D are four different physical quantities having different dimensions. None of them is dimensionless. But we know that the equation AD = C ln(BD) holds true. Then which of the combination is not a meaningful quantity?

(a) $\dfrac{C}{BD} - \dfrac{A^2D^2}{C}$ (b) $A^2 - B^2C^2$ (c) $\dfrac{A}{B} - C$ (d) $\dfrac{A^2 - AC}{D}$

24. The two slits at a distance of 1 mm are illuminated by the light of wavelength 6.5×10^{-7} m. The interference fringes are observed on a screen placed at a distance of 1 m. The distance between third dark fringe and fifth bright fringe will be

(a) 0.65 mm (b) 1.63 mm (c) 3.25 mm (d) 4.88 mm

Space for rough work

25. A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of 15 ms^{-1}. Then the frequency of sound that the observer hears in the echo reflected from the cliff is   (Take velocity of sound in air = 330 ms$^{-(a)}$)

    (a) 765 Hz   (b) 800 Hz   (c) 838 Hz   (d) 885 Hz

26. The ground state energy of H – atom is 13.6 eV. The energy needed to ionize H – atom from its second excited state is

    (a) 1.51 eV   (b) 3.4 eV   (c) 13.6 eV   (d) 12.1 eV

27. In a room where temperature is 30°C a body cools from 61°C to 59°C is 4 minutes. The time taken by the body to cool from 51°C to 49°C will be:

    (a) 4 minutes   (b) 6 minutes   (c) 5 minutes   (d) 8 minutes

28. Two balls of masses m and 2m are attached to the ends of a light rod of length L. The rod rotates with an angular speed ω about an axis passing through the centre of mass of system and perpendicular to the plane. Find the angular momentum of the system about the axis of rotation.

    (a) $\dfrac{2}{3} m\omega L^2$ (b) $\dfrac{1}{3} \omega^2 Lm$ (c) $\dfrac{2}{3} \omega^2 Lm$ (d) $\dfrac{1}{3} Lm$

29. A mercury thermometer isconstructed as shown in the diagram. The capillary tube has a diameter of 0.004 cm, and the bulb has a diameter of 0.250cm. Neglecting the expansion of the glass, find the change in height of the mercury column with a temperature change of 30.0^{0}C.

(a) 3.55 cm
(b) 2.60 cm
(c) 4.50 cm
(d) 3.33 cm

30. For c = 2a and a < b < c, the magnetic field at the point P will be zero then

(a) a = b

(b) $a = \dfrac{3}{5} b$

(c) $a = \dfrac{5}{3} b$

(d) $a = \dfrac{1}{3} b$

31. Photoelectric effect supports quantum nature of light because

    I. There is minimum frequency of light below which no photoelectrons are emitted.

    II. Electric charge of photoelectrons is quantized.

    III. Maximum kinetic energy of photoelectrons depends only on the frequency of light and not on its intensity.

    IV. Even when metal surface is faintly illuminated the photoelectrons leave the surface immediately.

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

Space for rough work

32. The driver of car travelling with a speed 30 meter/sec. towards a hill sounds a horn of frequency 600 Hz. If the velocity of sound in air is 330 m/s the frequency of reflected sound as heard by the driver is
(a) 720 Hz   (b) 555.5 Hz   (c) 550 Hz   (d) 500 Hz

33. The pendulum suspended from the ceiling of a train has a period T when the train is at rest. When the train is accelerating with a uniform acceleration, the period of oscillation will
    (a) increase   (b) decrease   (c) remain unaffected   (d) become infinite

34. In Young's double slit experiment, 12 fringes are obtained to be formed in a certain segment of the screen when the light of wavelength 600 nm is used. If the wavelength of light is changed to 400 nm, the number of fringes observed in the same segment of the screen is given by
    (a) 18   (b) 24   (c) 30   (d) 36

35. Assuming the sun to be a spherical body of radius R at a temperature of T K, evaluate the total radiant power, incident on earth, at a distance r from the sun. (r_0 is the radius of the earth and σ is stefan's constant)
    (a) $4\pi r_0^2 R^2 \sigma T^4 / r^2$ (b) $\pi r_0^2 R^2 \sigma T^4 / r^2$ (c) $r_0^2 R^2 \sigma T^4 / 4\pi r^2$ (d) $R^2 \sigma T^4 / r^2$

Section - B

36. A galvanometer, with a scale divided into 150 equal divisions, has current sensitivity of 10 divisions per milliampere and voltage sensitivity of 2 divisions per millivolt. Find shunt resistance for making an ammeter of 6 A.
    (a) $1.25 \times 10^{-3} \Omega$ (b) $12.5 \times 10^{-3} \Omega$ (c) $125 \times 10^{-3} \Omega$ (d) $0.125 \times 10^{-3} \Omega$

37. A change of 8.0 mA in the emitter current brings a change of 7.9 mA in the collector current. The values of α and β are
    (a) 0.99, 90   (b) 0.96, 79   (c) 0.97, 99   (d) 0.99, 79

38. The radius vector and linear momentum are respectively given by vector $2\hat{i} + 2\hat{j} + \hat{k}$ and $2\hat{i} - 2\hat{j} + \hat{k}$. Their angular momentum is
    (a) $2\hat{i} - 4\hat{j}$ (b) $4\hat{i} - 8\hat{k}$ (c) $2\hat{i} - 4\hat{j} + 2\hat{k}$ (d) $4\hat{i} - 8\hat{j}$

39. A long solenoid is formed by winding 20 turns/cm. The current necessary to produce a magnetic field of 20 millitesla inside the solenoid will be approximately
$$\left(\frac{\mu_0}{4\pi} = 10^{-7} \; Tesla \text{ - } metre \; / \; ampere \right)$$
(a) 8.0 A   (b) 4.0 A   (c) 2.0 AC   (d) 1.0 A

40. A spherically symmetric gravitational system of particles has a mass density $\rho = \rho_0$ for $r \le R$ and $\rho = 0$ for $r > R$, where ρ_0 is a constant. A test mass can undergo circular motion under the influence of the gravitational field of the particles. Which figure represents its speed v as a function of distance $r (0 < r < \infty)$ from the center of the system?
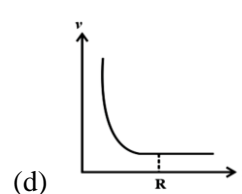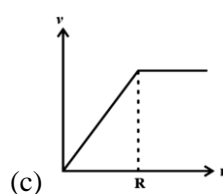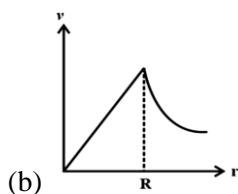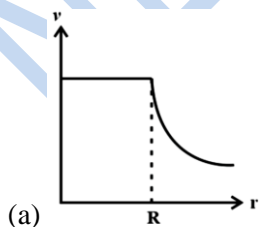
Space for rough work

41. When the angle of incidence on the material is 60^0, the reflected light is completely polarized. The velocity of refracted ray inside the material is

(a) $3 \times 10^8 \, m/s$ (b) $\dfrac{3}{\sqrt{2}} \times 10^8 \, m/s$ (c) $\sqrt{3} \times 10^8 \, m/s$ (d) $\dfrac{1}{3} \times 10^8 \, m/s$

42. Focal lengths of two lens are f and $f^{'}$ and dispersive powers are ω_0 and $2\omega_0$ respectively. To form achromatic combination from these

(a) $f' = 2f$ (b) $f' = -2f$ (c) $f' = \dfrac{f}{2}$ (d) $f' = -\dfrac{f}{2}$

43. For certain metal, incident frequency v is five times threshold frequency v_0 and the maximum velocity of the photoelectrons is $8 \times 10^6 \, ms^{-1}$. If $v = 2v_0$, the maximum velocity of photoelectrons will be

(a) $4 \times 10^6 \, ms^{-1}$ (b) $6 \times 10^6 \, ms^{-1}$ (c) $8 \times 10^6 \, ms^{-1}$ (d) $1 \times 10^6 \, ms^{-1}$

44. A cannon shell fired at an angle θ, with horizontal breaks into two equal parts at its highest point. One part retraces the path to the cannon with kinetic energy E_1 and kinetic energy of the second part is E_2, the relation between E_1 and E_2 is

(a) $E_2 = 15E_1$ (b) $E_2 = E_1$ (c) $E_2 = 4E_1$ (d) $E_2 = 9E_1$

45. The reading of the ideal ammeter will be (Resistance of ideal ammeters is zero)
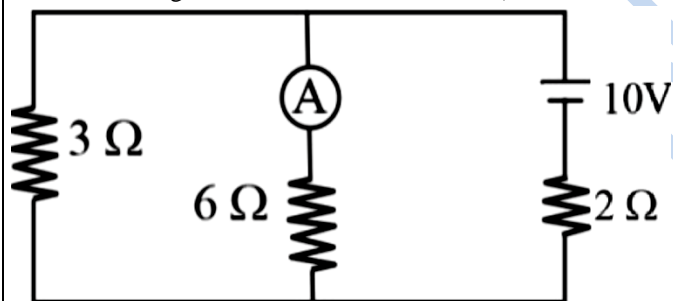
(a) 5/6 ampere (b) 6/5 ampere (c) 3/2 ampere (d) 2/3 ampere

46. A refrigerator absorbs 2000 cal of heat from ice trays. If the coefficient of performance is 4, then work done by the motor is
(a) 2100 J (b) 4200 J (c) 8400 J (d) 500 J

Space for rough work

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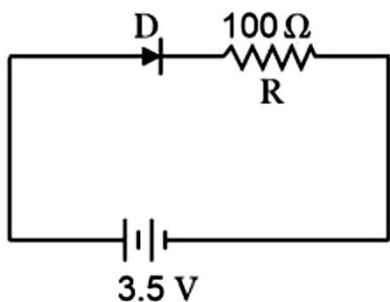

(a) 40 mA   (b) 20 mA   (c) 35 mA   (d) 30 mA

48. The earth (mass = $6 \times 10^{24} kg$) revolves around the sun with angular velocity $2 \times 10^{-7} rad\, s^{-1}$ in a circular orbit of radius $1.5 \times 10^{11} m$. The force exerted by the sun on the earth (in newton) is

(a) zero   (b) 18×10^{25} (c) 27×10^{39} (d) 36×10^{21}

49. From the top of a tower, a stone is thrown up and reaches the ground in time t_1=9s. A second stone is thrown down with the same speed and reaches the ground in time t_2=4s. A third stone is released from rest and reaches the ground in time t_3, which is equal to

(a) 6.5 s   (b) 6.0 s   (c) $\dfrac{72}{13} s$ (d) None

50. The activity of a sample reduces from A_0 to $\dfrac{A_0}{\sqrt{3}}$ in one hour. The activity after 3 hours more will be

(a) $\dfrac{A_0}{3\sqrt{3}}$ (b) $\dfrac{A_0}{9}$ (c) $\dfrac{A_0}{9\sqrt{3}}$ (d) $\dfrac{A_0}{27}$
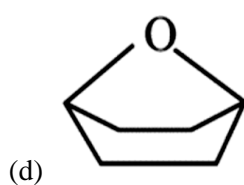
Space for rough work

1. The strength of $10^{-2} M$ Na_2CO_3 solution in terms of molality will be (density of the solution = 1.10 gml$^{-(a)}$ (M. wt Na_2CO_3 = 106)

   (a) 9×10^{-3} (b) 1.15×10^{-2} (c) 5.1×10^{-3} (d) I

2. The volume percentage of Cl_2 at equilibrium in the dissociation of PCl_5 under a total pressure of 1.5 atm is $\left(K_P = 0.202 \right)$

   (a) 74.5   (b) 36.5   (c) 63.5   (d) 26.6

3. The major product [P] formed in the following reaction is

   (a)   (b)   (c)   (d)
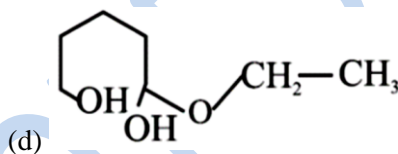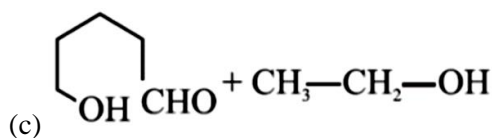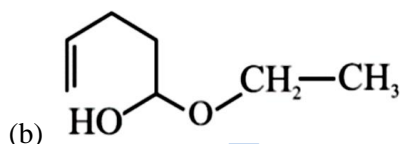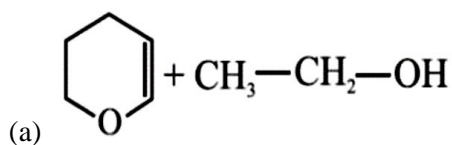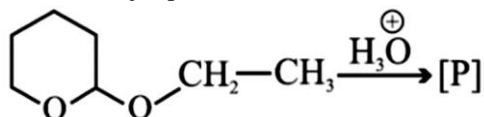
4. According to Bohr correspondence principle when quantum number is very large –

   (a) Frequency of revolution of electron in an orbit is equal to the frequency of photon emitted when electron jumps from that orbit to next lower orbit

   (b) Classical physics approaches quantum physics

   (c) Wavelength of electron De Broglie wavelength does not depend on kinetic energy of electron

   (d) Energy of electrons are not quantized

5. In the given reaction, what is [B]?

   (a)   (b)   (c)   (d)
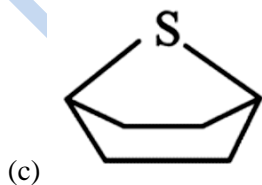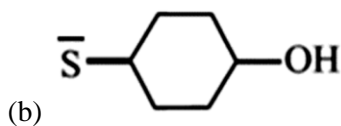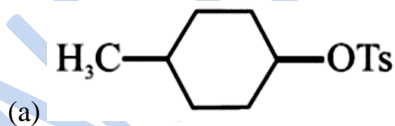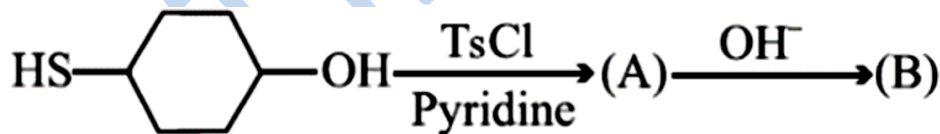
Space for rough work

6. For a certain atom, there are energy levels A, B,C corresponds to energy values $E_A < E_B < E_C$. Choose the correct option if $\lambda_1, \lambda_2, \lambda_3$ are the wavelength of radiations corresponding to the transition from C to B, B to A and C to A respectively.

    (a) $\lambda_3 = \lambda_1 + \lambda_2$ (b) $\lambda_3 = \dfrac{\lambda_1 \lambda_2}{\lambda_1 + \lambda_2}$ (c) $\lambda_1 + \lambda_2 + \lambda_3 = 0$ (d) $3\lambda_2 = \lambda_3 + 2\lambda_2$

7. Copper pyrite ore is concentrated by:
    (a) electromagnetic method   (b) gravity method   (c) froth floatation process   (d) all the above
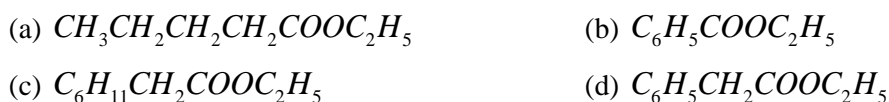
8. Which of the following esters cannot undergo Claisen self – condensation
    (a) $CH_3CH_2CH_2CH_2COOC_2H_5$ (b) $C_6H_5COOC_2H_5$
    (c) $C_6H_{11}CH_2COOC_2H_5$ (d) $C_6H_5CH_2COOC_2H_5$

9. Electrode potential data given below

    $$Cl_2 + 2H_2O \rightarrow 2ClO^- + 4H^+ + 2e^-; E^0 = -1.61 volt$$

    $$ClO^- + 2H_2O \rightarrow ClO_3^- + 4H^+ + 4e^-; E^0 = -0.50 volt$$
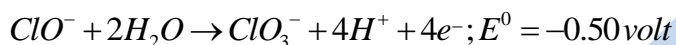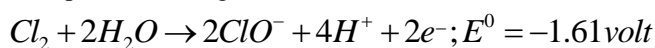
    Based on these data which is the spontaneous reaction.

    (a) $Cl_2 + ClO^- + ClO_3^-$ (b) $ClO^- \rightarrow Cl_2 + ClO_3^-$ (c) $ClO_3^- \rightarrow Cl_2 + ClO^-$ (d) $ClO^- + Cl_2 \rightarrow ClO_3^-$

10. The unit cell cube length for $LiCl$ ($NaCl$ type structure) is $5.14 A^0$. Assuming anion cation contact, calculate the ionic radius for chloride ion.
    (a) 1.815   (b) 3.63   (c) 2.75   (d) 5.14

11. Specific conductive of 0.1M HA is $3.75 \times 10^{-4} ohm^{-1} cm^{-1}$. If λ^∞ of HA is 250 ohm⁻¹cm²mol⁻¹, then dissociation constant K_a of HA is
    (a) 1×10^{-5} (b) 2.25×10^{-4} (c) 2.25×10^{-5} (d) 2.25×10^{-13}

12. The optical rotation of the $\alpha -$ form of a pyranose is +150.70, that of the $\beta -$ form is +52.80. In solution an equilibrium mixture of the anomer has an optical roation of +80.20. The percentage of the $\alpha -$ form at equilibrium is
    (a) 28%   (b) 32%   (c) 68%   (d) 72%

13.

    Product is

    (a)   (b)   (c)   (d)
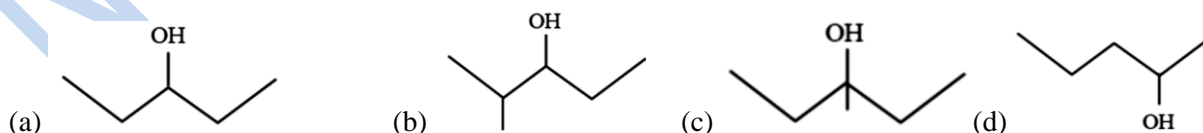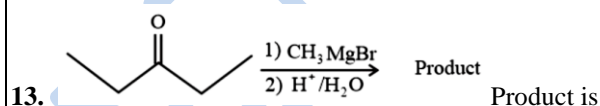
14. pH of a 10^{-10} M NaOH is nearest to
    (a) 10   (b) 7   (c) 4   (d) 10.9

Space for rough work

15. Sodium thiosulphate, $Na_2S_2O_3.5H_2O$ is used in photography to:

     (a) reduce the silver bromide grains to metallic silver

     (b) convert the metallic silver to silver salt

     (c) remove undecomposed $AgBr$ as soluble silver thiosulphate complex

     (d) remove reduced silver

16. In the chemical reaction

$$CH_3CH_2NH_2 + CHCl_3 + 3KOH \rightarrow (A), \text{ the } + (B) + 3H_2O$$

Compound (A) and (B) are respectively

     (a) C_2H_5NC and K_2CO_3 (b) $CH_3CH_2CONH_2$ and $3KCl$

     (c) C_2H_5CN and $3KCl$ (d) C_2H_5NC and $3KCl$

17. The change in entropy when the pressure of perfect gas is changed isothermally from P₁ to P₂ is

     (a) $\Delta S = nR\ln(P_1 + P_2)$ (b) $\Delta S = nR\ln(P_2 / P_1)$

     (c) $\Delta S = nR\ln(P_1 / P_2)$ (d) $\Delta S = nR\ln\left(\dfrac{P_1 + P_2}{P_2}\right)$

18. Which of the following metal is expected to have the highest third ionization enthalpy.

     (a) $Cr(Z = 24)$ (b) $V(Z = 23)$ (c) $Mn(Z = 25)$ (d) $Fe(Z = 26)$

19. Which of the following oxide of Nitrogen is neutral?

     (a) N_2O_5 (b) N_2O_3 (c) N_2O_4 (d) N_2O

20. The molal lowering of vapour pressure for water at 100⁰C, is

     (a) 760 mm   (b) 750 mm   (c) 13.43 mm   (d) 0.760 mm

21. Some type of gel like gelatin loose water slowly, the process is known as

     (a) synerisis   (b) thixotropy   (c) peptisation   (d) limbitition

22. The molar ratio of Fe^{++} to Fe^{+++} in a mixture of $FeSO_4$ and $Fe_2(SO_4)_3$ having equal number of sulphate ion in both ferrous and ferric sulphate is

   (a) 1 : 2   (b) 3 : 2   (c) 2 : 3   (d) can't be determined

23. If the temperature of an ideal gas in a sealed, rigid container is increased to 1.5 times the initial value (in K), the density of gas
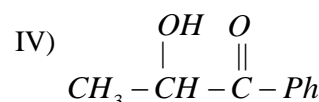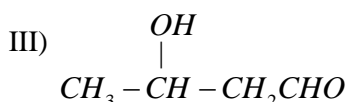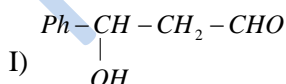
     (a) becomes 1.5 times the initial value   (b) becomes 1/1.5 times the initial value

     (c) becomes 2.25 times the initial value   (d) remains same

Space for rough work

24. As a part of a maintenance inspection the compressor of a jet engine is made to spin according to the graph as shown. The number of revolutions made by the compressor during the test is
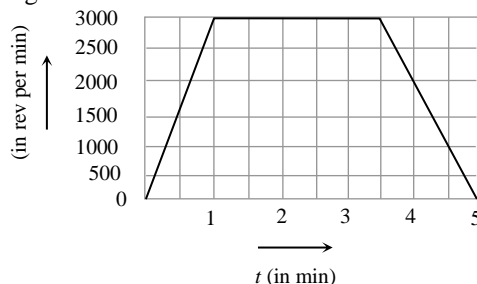
(a) 9000   (b) 16570   (c) 12750   (d) 11250

25. A chloride dissolves appreciable in cold water. When placed on platinum wire in Bunsen flame, no distinctive colour is noticed. Then the cation is

(a) Mg^{2+} (b) Ba^{2+} (c) Ag^{+} (d) Ca^{2+}

26. Orthoboric acid when heated to red hot gives:

(a) metaboric acid   (b) pyroboric acid   (c) boron and water   (d) diboron trioxide

27. One mole of a non – ideal gas undergoes a change of state (2.0 atom, 3.0L, 95 K) → (4atm, 5L, 245K) with a change internal energy, $\Delta E = 30.0 L\,atm$. The change in enthalpy, ΔH, of the process in L atom is

(a) 40.0   (b) 42.3   (c) 44.0   (d) not defined, because pressure is not constant

28. A body is attached to the lower end of a vertical spiral spring and it is gradually lowered to its equilibrium position. This stretches the spring by a length x. If the same body attached to the same spring is allowed to fall suddenly, what would be the maximum stretching in this case

(a) x   (b) 2x   (c) 3x   (d) x/2

29. The ΔH^0_f for $CO_2(g)$, $CO(g)$ and $H_2O(g)$ are – 393.5, - 110.5 and – 241.8 kJmol^{-1} respectively. The standard enthalpy changes (inkJ) for the reaction $CO_2(g) + H_2(g) \rightarrow CO(g) + H_2O(g)$ is

(a) 524.1   (b) 41.2   (c) – 262.5   (d) – 41.2

30. In a reaction carried out at 400 K, 0.01% of the total number of collisions is effective. The energy of activation of the reaction is

(a) 13.3 kJ/mol   (b) 23.5 kJ/mol   (c) 3.2 kJ/mol   (d) 30.6 kJ/mol

31. Identify the option which represents the correct products of the following reaction,

$$PhCHO + CH_3CHO \xrightarrow{OH^-} (Aldols)$$

I) $Ph-CH-CH_2-CHO$ with OH below CH   II) $PhCH_2 - COPh$ III) $CH_3 - CH - CH_2CHO$ with OH above CH   IV) $CH_3 - CH - C - Ph$ with OH and O above
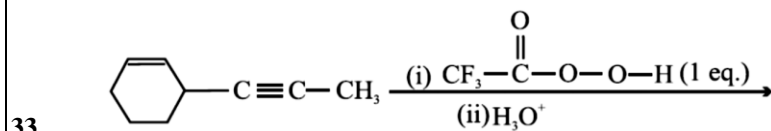
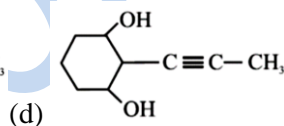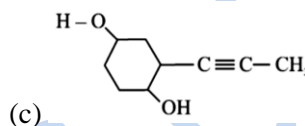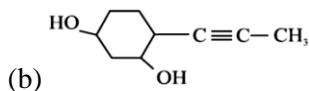(a) I, II   (b) I, III   (c) II, III   (d) I, III, IV

Space for rough work

32. A 0.001 molal aqueous solution of a complex $[MA_8]$ has the freezing point of -0.0054^0C. If the primary valency of the salt undergoes 100% ionization and K_f for water = 1.8 Kmolal^{-1} the correct representation of complex is

    (a) $[MA_8]$ (b) $[MA_6]A_2$ (c) $[MA_4]A_4$ (d) $[MA_5]A_3$

33.

    Identify the product

    (a)   (b)   (c)   (d)
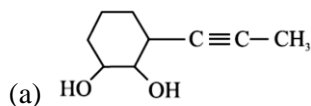
34. Bond angle in PH$_3$ is closer to 90^0 while that in NH$_3$ is 104.5^0. Which of the following best explains this structural feature?
(a) Due to larger size of the lone pair electron cloud, there is larger lone pair – bond pair repulsion in PH$_3$ compared to NH$_3$.
(b) Higher electronegativity of nitrogen concentrates the bond pair electron cloud near the central atom which increases the bond pair – bond pair repulsion which in turn decreases the bond angle in NH$_3$.
(c) Energy difference between 3s and 3p orbitals is quite high and hence the lone pair on phosphorous prefers to occupy unhybridized s – orbital rather than hybridized sp^3 hybridized orbital which causes its s – orbital energy to increase.
(d) Phosphorous forms $p\pi - d\pi$ bonds while nitrogen does not.

35. Non – polar molecule among the following is

    (a) SF_4 (b) $BF_3.NH_3$ (c) PF_3Cl_2 (d) XeF_4

SECTION - B

36. By which of the following method, H_2O_2 cannot be synthesized?

    (a) Addition of H_2SO_4 on BaO_2 (b) Addition of H_2SO_4 on PbO_2

    (c) Aerial oxidation of 2 – ethyl anthraquinol   (d) Electrolysis of $(NH_4)_2SO_4$ at a high current density

37. In hydrogen atom, an electron in its ground state absorbs two times of the energy as if requires escaping (13.6 eV) from the atom. The wavelength of the emitted electron will be

    (a) $1.34\times10^{-10}\,m$ (b) $2.34\times10^{-10}\,m$ (c) $3.34\times10^{-10}\,m$ (d) $4.44\times10^{-10}\,m$

38. Which of the following is inert towards S_N1 reaction?

    (a) Ethyl chloride   (b) Isopropyl chloride   (c)   (d)
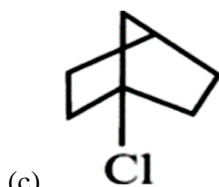
Space for rough work

39. A square coil of N turns (with length of each side equal L) carrying current i is placed in a uniform magnetic field $\vec{B} = B_0\hat{j}$ as shown in figure. What is the torque acting on the coil
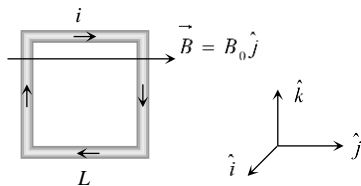
(a) $+ B_0 NiL^2\hat{k}$ 　　　　(b) $- B_0 NiL^2\hat{k}$ 　　　(c) $+ B_0 NiL^2\hat{j}$ 　　　　(d) $- B_0 NiL^2\hat{j}$

40. An organic compound (A) contains 20% C, 46.66% N and 6.66% H. It gave NH$_3$ gas on heating with NaOH. The organic compound (A) could be

(a) CH_3CONH_2 　　(b) $C_6H_5CONH_2$ 　　(c) NH_2CONH_2 　　(d) $CH_3NHCONH_2$

41. Which of the following drugs is an alagesic?
　　(a) Sulpha guanidine 　(b) Paludrin 　　　　(c) Analgin 　　　　　(d) All of these

42. Which of the following is not an actinoid?
　　(a) Curium (Z=96) 　　(b) Californium (Z=98) (c) Uranium (Z=9(b) 　　　(d) Terbium (Z=65)

43. The conversion: Can be effected by
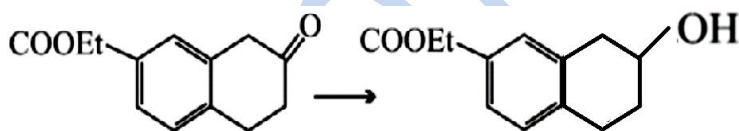
(a) $LiAlH_4$ reduction 　　　　(b) Clemmensen's reduction 　　(c) NaBH₄ reduction 　(d) H_2 / Ni reduction

44. The plots of intensity versus wavelength for three black bodies at temperatures T$_1$, T$_2$ and T$_3$ respectively are as shown. Their temperature are such that

(a) T$_1$>T$_2$> T$_3$ 　　　　　(b) T$_1$>T$_3$> T$_2$ 　　　(c) T$_2$>T$_3$> T$_1$ 　　(d) T$_3$>T$_2$> T$_1$

45. Which of the following chemical equation represents the formation of colloidal solution?

(a) $Cu + CuCl_2 \rightarrow Cu_2Cl_2$ 　　　　　　(b) $2Mg + CO_2 \rightarrow 2MgO + C$

(c) $2HNO_3 + 3H_2S \rightarrow 3S + 4H_2O + 2NO$ 　　(d) Both 2 & 3
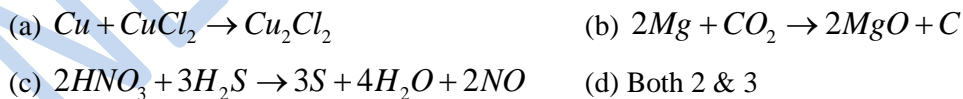
46. The anomeric carbon in $D(+)$ glucose is
　　(a) C – 1 carbon 　　　(b) C – 2 carbon 　　　(c) C – 5 carbon 　　　(d) C – 6 carbon

Space for rough work

47. Consider the following statement:

(I) $CH_3O\overset{\oplus}{C}H_2$ is more stable than $CH_3\overset{\oplus}{C}H_2$ (II) $Me_3\overset{\oplus}{C}$ is more stable than $CH_3CH_2\overset{\oplus}{C}H_2$

(III) $CH_2=CH-\overset{\oplus}{C}H_2$ is more stable than $CH_2=CH-\overset{\oplus}{C}H_2$ (IV) $CH_2=\overset{\oplus}{C}H$ is more stable than $CH_3\overset{\oplus}{C}H_2$

Of these statement:

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

48. On of the processes used for concentration of ores is Froth floatation process. This process is generally used for concentration of sulphide ores. Sometimes in this process we add NaCN as a depressant. NaCN is generally added in case of ZnS and PbS minerals. What is the purpose of addition of NaCN during the process of Forth floatation?

(a) NaCN causes reduction by precipitation

(b) A soluble complex is formed by reaction between NaCN and ZnS while PbS forms froth

(c) A soluble complex is formed by reaction between NaCN and PbS while ZnS forms froth

(d) A precipitate of $Pb(CN)_2$ is produced while ZnS remain unaffected.

49. Correct sequence for reactivity of acid derivative is

I) $(RCO)_2O$ II) $RCOCl$ III) $RCOOR$ IV) $RCONH_2$

(a) II > I > III > IV   (b) I > II > III > IV   (c) II > I > IV > III   (d) I > III > II > IV

50. A crystal is made of particles X, Y and Z. X forms FCC packing, Y occupies all octahedral voids of X and Z occupies all tetrahedral voids of X. If all the particles along one body diagonal are removed, then the formula of crystal would be

(a) XYZ_2 (b) X_2YZ_2 (c) $X_8Y_4Z_5$ (d) $X_5Y_4Z_8$

Space for rough work

1. Adhesion is the result of –
   (a) Hydrogen bonding between the water molecules
   (b) Transpiration pull
   (c) High surface tension
   (d) Attraction of water molecules to polar surface / hydrophilic wall of the xylem tube

2. Given below is the pedigree of an autosomal dominant disorder-Myotonic dystrophy. In this pedigree the genotype of all affected children will be –
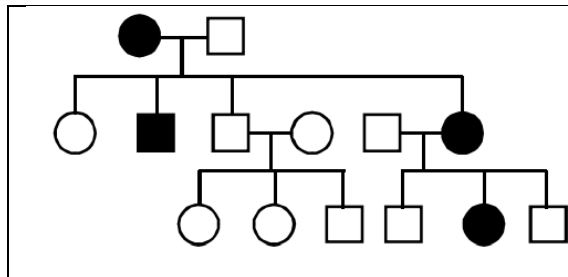
   (a) AA
   (b) Aa
   (c) AA or Aa
   (d) aa

3. CAM plants belong to family
   (a) Malvaceae   (b) Crassulaceae   (c) Trapaceae   (d) Orchidaceae.

4. The type of growth where new cells are always being added to the plant body by the activity of meristem is called
   (a) closed form of growth   (b) diffused form of growth
   (c) open form of growth   (d) discontinuous form of growth

5. Which of the following condition is hybrid breakdown
   (a) Failure of hybrid adult to produce functional gametes
   (b) Failure of the fusion of ova and sperm plant breed of two species
   (c) Failure of hybrid zygote to develop into an offspring
   (d) None of these

6. Is the ability to fix nitrogen limited to certain organisms –
   (a) No, all bacteria can fix nitrogen   (b) Yes, only some bacteria and plant can fix nitrogen
   (c) Yes, only some bacteria can fix nitrogen   (d) No, all organisms can fix nitrogen

7. Hybridisation involves
   (a) Removal of stamens   (b) Removal of stigma   (c) Male sterility   (d) Female sterility

8. The first enzyme isolated in crystalline form was
   (a) Catalase   (b) Urease   (c) Peroxidase   (d) Amylase

9. What are the factors affecting the rate of diffusion?
   (a) Permeability of membrane   (b) Temperature   (c) Pressure   (d) All of the above

10. Unloading of minerals ions occurs at the fine vein endings through –
    (a) Diffusion only   (b) Active transport only   (c) Diffusion and active transport   (d) Facilitated diffusion and active transport

11. The *correct* sequence of plants in a hydrosere is:
    (a) Oak→Lantana→Volvox→Hydrilla→Pistia →Scirpus   (b) Oak→Lantana→Scirpus→Pistia→Hydrilla→Volvox
    (c) Volvox → Hydrilla → Pistia → Scirpus → Lantana→Oak   (d)Pistia→Volvox→Scirpus→Hydrilla→Oak →Lantana

Space for rough work

12. PEP is primary CO_2 acceptor in
    (a) C_4 plants
    (b) C_3 plants
    (c) C_2 plants
    (d) Both (a) and (b)

13. Which of the following is correct?
    (a) Cyanobacteria form mycorhhiza which helps in absorption of phosphate

    (b)*Methanobacterium* digest cellulose in anaerobic conditions

    (c)*Azotobacterfix* nitrogen symbiotically

    (d)*Rhizobium* can fix nitrogen both free living and symbiotically

14. I. Temperature II. CO_2 concentration   III. Chlorophyll arrangement   IV. Water
    Among the given factors, identify the external factors that affect the rate of photosynthesis and choose the correct option accordingly.

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

15. Monarch butterfly escapes from predators by?
    (a) Foul smell
    (b) bitter taste
    (c) Colour combination
    (d) Rough skin

16. Substrate concentration at which an enzyme attains half of its max. velocity is ?
    (a)Half life of enzyme
    (b) Km-constant of enzyme
    (c) Concentration ratio
    (d) None

17. The International Centre for Genetic Engineering and Biotechnology established by the United Nations Organization (UNO) is located at
    (a)   New Delhi
    (b)   Paris
    (c)   Tokyo
    (d)   Washington

18. Nitrogenase enzymes react with the substrate N_2 with _____ hydrogen atoms before releasing product –
    (a) 2
    (b) 3
    (c) 6
    (d) 5

19. Racemose inflorescence is identified by -
    (a) Acropetal arrangement of flowers on peduncle
    (b) Presence of sessile flowers
    (c) Continuous growth of main axis
    (d) a and c

20. You can protect yourself from too much exposure to UV radiation by taking two of the following precautions. Which two?
    (a) Wear sunscreen with both UVA and UVB protection
    (b) Wear clothing to prevent UV radiation from penetrating your skin
    (c) Avoiding sunlight during peak UV hours
    (d) Both a and c

21. Any one parameter is not good enough to demonstrate growth through the life of a flowering plant because
    (a) lateral meristems appear later in life
    (b) apical meristems contribute to elongation, while lateral meristems increase girth
    (c) increase in protoplasm is difficult to measure directly
    (d) None of the above

22. Polyarch and exarch vascular bundles are the characteristic of
    (a) Dicot stem
    (b) Dicot root
    (c) Monocot stem
    (d) Monocot root

23. Butterfly shaped corolla is called
    (a) Campanulate
    (b) Rotate
    (c) Papilionaceous
    (d) All

24. Which one is a parasitic agla?
    (a) *Oedogonium*
    (b) *Cephaleuros*
    (c) *Spirogyra*
    (d) *Cladophora*

25. Which of the following crops occupies the highest area in India?
    (a) rice
    (b) wheat
    (c) gram
    (d) sugarcane

Space for rough work

26. This hormone affects opening and closing of stomata
   (a) GA   (b) Kinetin   (c) ABA   (d) IBA

27. The pioneer country in the production of 'Fuel alcohol' is
   (a) Japan   (b) Brazil   (c) Saudi Arabia   (d) India

28. Processing of single cell protein generally involves removal of
   (a) nucleic acids   (b) fats   (c) Carbohydrates   (d) oils

29. Improved Indian variety of wheat, carrying genes of dwarfness and higher percentage of protein and lysine is
   (a) Lerma safed   (b) Kalyan   (c) Sharbati sonara   (d) Sonalika

30. Study the given pedigree carefully, the trait indicated is :- :

   : Normal male
   : Affected male
   : Normal female
   : Affected female
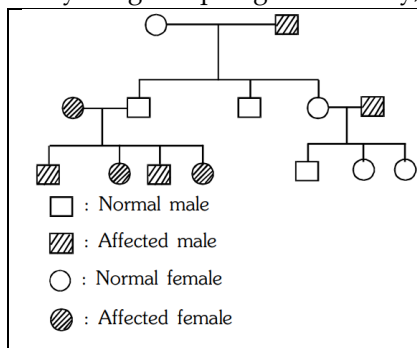
   (a) Autosomal recessive
   (b) X–linked recessive
   (c) Maternal inheritance
   (d) Paternal inheritance

31. Reduction of one molecule of nitrogen into 2 molecules of NH_3 consumes –
   (a) 4 molecules of ATP   (b) 16 molecules of ATP   (c) 56 molecules of ATP   (d) 38 molecules of ATP

32. If the light becomes unavailable during photosynthesis then
   (a) immediately biosynthetic process stops
   (b) biosynthetic phase does not stop
   (c) biosynthetic phase stops forever
   (d) biosynthetic phase continues for some time and then stops

33. Production of plant without fertilization is done by
   (a) Vegetative propagation   (b) Transplantation   (c) Grafting   (d) None of these

34. Which of the following methods for transporting substances across a membrane does not involve a change in shape of transport protein –
   (a) Facilitated diffusion   (b) Simple diffusion   (c) Active Transport   (d) $Na^+ – K^+$ Pump

35. Which type of chloroplasts are present in the members of class–Chlorophyceae?
   (a) Discoid and plate-like   (b) Reticulate and cup-shaped
   (c) Spiral or ribbon-shaped   (d) All of the above

SECTION - B

36. Reaction carried out by N_2 metabolizing microbes include –
   (i) $2NH_3 + 3O_2 \rightarrow 2NO_3 + 2H^+ + H_2O$ (ii) $2NO_2^- + O_2 \rightarrow 2NO_3^-$
   Which of the following statements about these equations is not correct –
   (a) Step (i) is carried out by Nitrosomonas or Nitrococcus   (b) Step II is carried out by Nitrobacter
   (c) Both steps I and II can be called nitrification   (d) Bacteria carrying out these steps are usually photoautotrophs

37. Clonal selection technique is not useful for
   (a) Sugarcane   (b) Wheat   (c) Potato   (d) Onion

38. Desired improved variety of economically useful crops are raised by

Space for rough work

(a) Natural selection   (b) Hybridization   (c)   Mutation (d)   Biofertilizer

39. Which is the National Aquatic Animal of India?
(a) Gangetic shark   (b) River dolphin   (c) Blue whale   (d) Sea‑horse

40. Root is meant for -
(a) The fixation of plant   (b) Absorption of water   (c) Storage of food   (d) All of the above

41. First bioinsecticide developed on commmercial scale was
(a) Quinine   (b) DDT   (c) Organophosphates   (d) Sporeine

42. Mutations are usually induced by
(a) Alfa rays   (b) Beta rays   (c)   Gamma rays   (d)   White light

43. Edible part of Areca Nut is
(a) Epicarp   (b) Mesocarp   (c) Endocarp   (d) Endosperm.

44. During embryo development, if the apical pole is towards the base of the venter, the polarity is
(a) Exoscopic   (b) Endoscopic   (c) Basal   (d) Lateral

45. Male heterogamy found in case of
(a) XO type male in Grasshopper   (b) XY type male in human
(c) ZW male in birds   (d) 1 and 2 both

46. Blue dye is obtained from the leaves of
(a) *Indigofera tinctoria*   (b) Opium   (c) *Aloe*   (d) *Delbergia sisoo*

47. Which one of the following is an improved variety of maize
(a) N.P. 710   (b) Co. 4   (c)   Jawahar   (d)   S. 405

48. Some vascular bundles are described as open because these :
(a) Are surrounded by pericycle but no endodermis   (b) Are capable of producing secondary xylem and phloem
(c) Posses conjunctive tissue between xylem and phloem   (d) Are not surrounded by pericycle

49. When xylem and phloem are arranged in an alternate manner on separate radii, such a vascular bundle is called
(a) Radial   (b) Bicollateral   (c) Concentric   (d) Conjoint

50. Match the column and select the correct option: ‑

	Column ‑ I (Hormone)		Column ‑ II (Function)
a	Cytokmm	I	Senesecence
b	Ethylene	II	Seed development
c	ABA	III	Cell growth
d	Auxin	IV	Helpful m shoot and root formation

(a) a‑III, b‑I, c‑II, d‑IV   (b) a‑I, b‑II, c‑III, d‑IV

(c) a‑II, b‑I, c‑III, d‑IV   (d) a‑III, b‑I, c‑IV, d‑II

Space for rough work

1. Amphibians breed
    (a) In crevices   (b) In water   (c) On trees   (d) In soil

2. Mode of nutrition in fungi is
    (a) Parasitic   (b) Saprophytic   (c) Autotrophic   (d) Heterotrophic

3. In which of the following periods dinosaurs were maximux developed?
    (a) Mesozoic   (b) Coenozoic   (c) Palaeozoic   (d) Proterozoic

4. Reduction of one molecule of nitrogen into 2 molecules of NH_3 consumes –
    (a) 4 molecules of ATP   (b) 16 molecules of ATP   (c) 56 molecules of ATP   (d) 38 molecules of ATP

5. The action potential of a nerve cell is
    (a) 60 mV   (b) 55 mV   (c) 80 mV   (d) 75 mV

6. What is vital capacity of our lungs?
    (a) inspiratory reserve volume plus expiratory reserve volume   (b) total lung capacity minus residual volume
    (c) inspiratory reserve volume plus tidal volume   (d) total lung capacity minus expiratory reserve volume

7. Bundles of nerve fibres are enclosed in a sheath called
    (a) Fascicle   (b) Endoneurium   (c) Epineurium   (d) Perineurium

8. In a certain plant, yellow fruit colour (Y) is dominant to green (y) and round shape (R) is dominant to oval (r). The two genes involved are located on different chromosomes.
    Where of the above will result when plant YyRr is backcrossed (testcrossed) with the double recessive parent?
    (a) 9:3:3:1 ratio of phenotypes only   (b) 9:3:3:1 ratio of genotypes only
    (c) 1:1:1:1 ratio of phenotypes only   (d) 1:1:1:1 ratio of phenotypes and genotypes

9. Synthesis of histone proteins occurs in.
    (a) G_1 phase   (b) anaphase   (c) Interphase   (d) G_0 phase.

10. Generally growth and reproduction are –
    (a) Mutually inclusive events   (b) Mutually exclusive events   (c) Either a or b   (d) None

11. Which of the following salivary gland is absent in human beings?
    (a) Zygomatic   (b) Parotids
    (c) The sub-maxillary/sub-mandibular (lower jaw)   (d) The sub-linguals (below the tongue)

12. Identify the incorrect one.
    (a) There are techniques that are able to detect the minerals even at 10^{-8} g/ml
    (b) Micronutrients are needed in very small amounts (less than 10 mmole kg^{-1} of dry wt).
    (c) Cu is essential for overall metabolism in plants.
    (d) Cu is absorbed as cuprus form.

13. Which of the following is not correctly matched with its use?
    (a) Taq polymerase–DNA polymerase used in polymerase chain reaction
    (b) Gene gun –Used for introducing recombinant DNA into plant cells with the help of fast moving gold or tungsten particles
    (c) Ethidium bromide –Stain used for observing DNA fragments under UV-rays
    (d) Chilled ethanol – To precipitate proteins from suspension

Space for rough work

14. One reason for emphysemaA is -
(a) Cigarette smoking   (b) Drug addition   (c) Wine consumption   (d) Heavy exercise

15. During resting stage the binding site of actin for myosin remains masked by
(a) Troponin   (b) Gactin   (c) Tropomyosin   (d) Meromyosin

16. An organism with two identical alleles is said to be –
(a) Hybrid   (b) Homozygous   (c) Heterozygous   (d) Dominant

17. Cyclosporine A is produced commercially by action of:
(a) Trichoderma--Fungus   (b) Trichoderma—Bacteria   (c) Monascus--Fungus   (d) Monascus—Bacteria

18. Which of the following compounds is used directly to build proteins –
(a) NH_3 (b) N_2 (c) Nitrate   (d) Nitrite

19. Cellular fumaces of cells are -
(a) Chloroplast   (b) Mitochondria   (c) Ribosome   (d) Nucleus

20. The pulse beat is measured by the
(a) Artery   (b) Capillary   (c) Vein   (d) None

21. Most of the transgenic animals are:
(a) Mice   (b) Cows   (c) Pigs   (d) Rabbits

22. Ptyalin is secreted by -
(a) Stomach   (b) Salivary gland   (c) Pancreas   (d) Bile

23. An individual sarcomere consist of-
(a) A stack of actin fibres   (b) A stack of myosin units
(c) Overlapping actin and myosin   (d) Overlapping myosin and membrane

24. Which one is the correct sequence of a cell cycle?
(a) $G_2 \rightarrow M \rightarrow G_1 \rightarrow S$ (b) $S \rightarrow G_2 \rightarrow M \rightarrow G_1$ (c) $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$ (d) $M \rightarrow G_1 \rightarrow S \rightarrow G_2$

25. An autoimmune disease is
(a) Rheumatoid arthritis   (b) Multiple sclerosis   (c) Insulin dependent diabetes   (d) All of these

26. Sea lilies are the members of class
(a) Ophiuroidea   (b) Asteroidea   (c) Crinoidea   (d) Echinoidea

27. Main function of golgi - complex is : -
(a) Fermentation   (b) Phosphorylation   (c) Respiration   (d) Packaging of materials for secretion

28. A contraceptive pill prevents ovulation by:-
(a) Blocking fallopian tube   (b) Inhibiting release of FSH & LH
(c) Stimulating release of FSH & LH   (d) Causing immedediate degeneration of released ovum

Space for rough work

29. Dung of cattle is predominantly rich in …….1…… and is used to make…..2….. .
(a) 1-Fungi, 2-Biogas   (b) 1-Fungi, 2-Water gas   (c) 1-Bacteria, 2-Biogas   (d) 1-Bacteria, 2-Water gas

30. Which of the following hormones is secreted by implanted blastocyst, that acts on the Corpus luteum in the ovary, stimulating the body to produce estrogens and progesterone to maintain the uterine lining?
(a) Lactogen   (b) hCG   (c) Progesterone   (d) Oxytocin

31. Which of the following 'suffixes' used for units of classification in plants indicates a taxonomic category of 'family'?
(a) – Ales   (b) – Onae   (c) – Aceae   (d) - Ae

32. Which of the following modes of reproduction can be found in at least some protists?
(a) Binary fission   (b) Sexual reproduction   (c) Spore formation   (d) All

33. Read the following statements and select the correct option.
Statement 1 : Reproduction cannot be considered as defining property of living organisms.
Statement 2 : There are many living organisms which do not reproduce e.g. mules, worker bees, infertile human couples, etc.
(a) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.
(b) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
(c) Statement 1 is true and statement 2 is false.
(d) Both statements 1 and 2 are false.

34. Which of the following crosses will give tall and dwarf pea plants in same proportions?
(a) TT × tt   (b) TT × Tt   (c) tt × tt   (d) Tt × tt

35. Find the incorrect disease is
(a) Culex – malaria   (b) Xenopsylla – plague   (c) Aedes – yellow fever   (d) Phlebotomus – kala-azar

Section - B

36. Asthma may be attributed to :
(a) bacterial infection of the lungs   (b) allergic reaction of the mast cells in the lungs
(c) inflammation of the trachea   (d) accumulation of fluid in the lungs

37. Which of the following method of contraception has least side effect ?
(a) IUD   (b) Pills   (c) Coitus interruptes   (d) Cervical cap

38. When a moist bread is kept exposed in air, it becomes mouldy and black because
(a) Spores are present   (b) Spores are present in the bread
(c) Spores are in the air   (d) The bread gets decomposed

39. Exchange of gases-
(a) Occurs between the alveoli and pulmonary blood capillary   (b) Occurs between blood and tissues
(c) By diffusion   (d) All

40. Which of the following is an incorrect match?
(a) DCT - Absorptions of glucose   (b) Bowman's capsule - Glomerular filtrations
(c) Henle's loops - Concentrations of urine   (d) PCT -   Absorptions of Na^+ and K^+ ions

41. Which substance can be used as male contraceptive in future:-
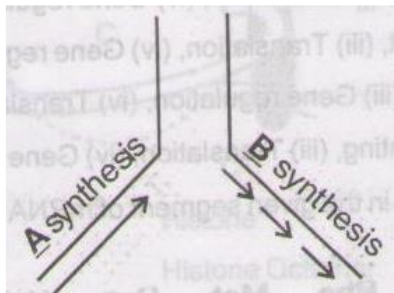(a) FSH   (b) LH   (c) Testosterone   (d) Progesterone

Space for rough work

42. In male cockroach, mushroom gland, acting as an accessory reproductive gland, is situated in the abdominal segments
(a) 4th - 5th (b) 6th - 7th (c) 7th - 8th (d) 8th - 10th

43. Which of the following is a pair of viral diseases?
(a) Common cold, AIDS   (b) Dysentery, common cold   (c) Typhoid, tuberculosis`   (d) Ringworm, AIDS

44.

Name the types of synthesis A and B occurring in the replication fork of DNA as shown below:
(a) A - Continuous synthesis (synthesis of leading strand);
B - Discontinuous synthesis (Synthesis of lagging strand).
(b) A - Discontinuous synthesis (synthesis of leading strand); B - Continuous synthesis (Synthesis of lagging strand).
(c) A - Continuous synthesis (synthesis of lagging strand);
B - Discontinuous synthesis (Synthesis of leading strand).
(d) A - Discontinuous synthesis (synthesis of lagging strand); B - Continuous synthesis (Synthesis of leading strand).

45. How much amount of volume of air is in lungs FRC
(a) 1500 ml to 1600 ml   (b) 2100 ml to 2500 ml   (c) 2500 ml to 300 ml   (d) 1600 ml to 2100 ml

46. A gland not associated with alimentary canal is
(a) Pancreas   (b) Liver   (c) Salivary glands   (d) Adrenal

47. Which is activated in stress condition
(a) Sympathetic   (b) Parasympathetic   (c) Somatic   (d) Whole *ANS*

48. Test tube baby means a baby born when
(a) It is developed in a test tube
(b) It is developed through tissue culture method
(c) The ovum is fertilised externally and there after implanted in the uterus
(d) It develops from a non-fertilized egg

49. Root cap is absent in
(a) Xerophyte   (b) Hydrophyte   (c) Mesophyte   (d) Halophyte

50. Which enzyme is used for isolation of genetic material from a fungal cell?
(a) Lysozyme   (b) Pectinase   (c) Chitinase   (d) Cellulase

Space for rough work