

I.Q**Section - I****Straight Objective Type**

This section contains 30 multiple choice questions numbered 1 to 30. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

Directions: (Q.No. 1 - 3) :In the following questions assuming the given statements to be True, find which of the conclusion among given conclusions is/are true and then give your answers accordingly.

1. **Statements:**

$M > N \geq O = P$; $O < Q = R > S \geq T$; $R < U \leq V$

Conclusions:I. $O \leq V$ II. $P < U$

(A) Only conclusion I follows

(B) Only conclusion II follows

(C) Both conclusions follow

(D) Either conclusion I or conclusion II follows

2. **Statements:**

$P = Q$; $Q > R$; $R < S$; $S < T$

Conclusions:I. $R > T$ II. $T < P$ III. $S < Q$

(A) Only I

(B) Only II

(C) Only III

(D) None of the three

3. **Statements:**

$A > B$; $X = Y$; $Y < Z$; $Z < A$

Conclusions:I. $B > Y$ II. $A > X$ III. $X < B$

(A) Only conclusion I follows

(B) Only conclusion II follows

(C) Both conclusions follow

(D) Either conclusion I or conclusion II follows

Directions: (Q.No. 4 - 7) Study the following information and choose the correct option.

Eight people Kiran, Asha, Ramesh, Raju, Anju, Anil, Lovely, and Rahul are sitting around a square table in such a way that neighbor of each person is facing in opposite direction to the former. Anil is sitting in the middle and facing the center. Lovely is sitting second to the right of Anil. Asha is not an immediate neighbour of Rahul. Rahul and Lovely are not immediate neighbors. Ramesh is sitting at corner and third left to Rahul. Raju is sitting opposite to Ramesh. Kiran is an immediate neighbor of Anil. Kiran is not an immediate neighbour of Lovely.

4. Among the following, who is sitting between Anju and Raju.

(A) Asha

(B) Ramesh

(C) Rahul

(D) Kiran

5. Who are immediate neighbors of Anju?

(A) Rahul, Raju

(B) Lovely, Rahul

(C) Ramesh, Anju

(D) Asha, Rahul

6. Who is sitting 4th next to Kiran in clockwise direction?

(A) Raju

(B) Rahul

(C) Anju

(D) Asha

Space for Rough Work

7. If sitting positions of Anil and Raju, Asha and Kiran are interchanged, who will be sitting opposite to Ramesh?
(A) Raju (B) Lovely (C) Anju (D) Anil
8. If in a certain language, PUZZLING is written as TNJMBPJH, then which word would be written as YGZHPGHH?
(A) BUZZING (B) UNPUZZLE (C) GUZZLING (D) SIZZLING

Direction: (Q.No. 9 - 12) Study the information given carefully and answer the question given below.

In a certain code language,
“work and play” is coded as “xk4 bd3 qy4”
“hard work pays” is coded as “qs4 id4 xk4”
“playing maintains health” as “ns9 qg7 ih6”
“playing keeps body fit” as “ls5 gt3 qg7 cy4”

9. What is the code for “work hard and play rough”?
(A) xk4 gd4 qy4 bd3 qh5 (B) id4 xk4 qy4 sh5 bd3
(C) vk5 hd3 py6 bd3 sh5 (D) dh3 ry6 hs5 vk5 bd3
10. What will be code for “testbook” in this coded language?
(A) so6 (B) uo8 (C) uk9 (D) uk8
11. “qn6” may be code for which of the following word?
(A) region (B) pension (C) pigeon (D) pamper
12. Which of the below represents correct code for “regional food”?
(A) g4d, ql8 (B) ql8, gd4 (C) gd4, sl8 (D) sl8, gd4
13. What will be the fourth letter of a meaningful English word which can be formed using all vowels & consonants G, D, N & T, each letter must be used only once?
(A) A (B) G (C) D (D) E

Direction: (Que No. 14 - 15) Study the following information carefully and answer the question that follows:

In a joint family, there are 10 people Avi, Bob, Cathy, Danny, Eliza, Fabia, Gia, Harman, Ivan, and Joe. Eliza is the only grand-daughter of Bob Son of Bob is Avi. Avi and Cathy are the parents of two children, one boy and a girl where Danny is the boy child Harman is son of Danny. Ivan is brother of Harman and son of Gia Joe is brother of Avi.

14. How is Eliza related to Harman?
(A) Niece (B) Aunt (C) Sister-in-law (D) Uncle
15. How is Gia related to Cathy?
(A) Son (B) Daughter (C) Daughter-in-law (D) Mother

Space for Rough Work

16. How many such pairs of the letters in the word REVERSE each of which has as many letters between them in the word (in both forward and backward directions), as they have between them in English alphabetical series?
(A) One (B) Two (C) Three (D) Four

Study the following arrangement carefully and answer the questions given below:

G V @ 8 4 B 7 H \$ 6 L % M 3 ? A N K © 5 4 F 9 # Y

17. If the ninth and tenth element from the left end is interchanged, what is the seventeenth element from the right end?
(A) \$ (B) L (C) H (D) 6
18. In the question, a series is given, with one term missing. Choose the correct alternative from the given ones that will complete the series. MN81, JR27, GV9, DZ3, ?
(A) AD1 (B) YC1 (C) ZB9 (D) AD9

Directions: (Q.No. 19 - 20): In the question below are given three statements followed by two conclusions numbered I and II. You have to take the given statements to be true even if they seem to be at variance with commonly known facts. Read all the conclusions and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

19. Statements:

Some cakes are books.

No book is food

All foods are goats.

Conclusions:

I. It is possible all goats are cakes.

II. Some foods are both goat and cakes.

- (A) Only I follows (B) Only II follows (C) Either I or II follow (D) Both I and II follow

20. Statements:

All doors are windows.

All windows are chairs.

Some chairs are sofas.

Conclusions:

I. Some sofas are doors.

II. Some windows are doors.

- (A) Only I follows (B) Only II follows (C) Either I or II follow (D) Both I and II follow

Space for Rough Work

Directions: (Q. No. 21 - 22)

Point A is 3 m to the west of B, Point W is 5 m to the south of B, Point M is 7 m to the south of X and 9 m to the east of point W. Point N is 4 m to the north of Point A

21. If point P is 12 m to the west of point X, which of the following points make a STRAIGHT line?
(A) B, M and X (B) N, P and B (C) N, P and A (D) B, X and N
22. What is the direction of point A with respect to point M?
(A) North – East (B) South – East (C) North – West (D) South – West
23. Which of the following expressions should replace the question marks, in that order in the given expression, in order to make the expressions 'J > Y' true?
 $? \leq ? > ? = ? \geq ?$
(A) J, Y, L, X, D (B) Y, L, J, D, X (C) J, L, Y, D, X (D) D, J, L, Y, X

Directions: (Que No. 24 - 25) The following question, consist of two words each that have a certain relationship to each other, followed by four lettered pairs of words. Select the lettered pair that has the same relationship as the original pair of words.

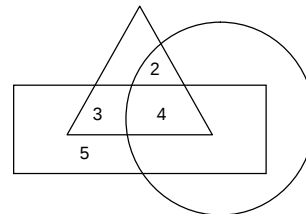
24. Pleasure : Smile :: Pain : ?
(A) Aspirin (B) Suffering (C) Grimace (D) Tranquility
25. EYES : TEARS :: ? : ?
(A) sea : water (B) volcano : lava (C) heart : artery (D) hunger : bread
26. Three generous friends, each with some money, redistribute the money as follows: Sandra gives enough money to David and Mary, to double the amount of money each has. David then gives enough to Sandra and Mary, to double their amounts. Finally, Mary gives enough to Sandra and David, to double their amounts. If Mary had 11 rupees at the beginning and 17 rupees at the end, what is the total amount that all three friends have?
(A) 105 (B) 60 (C) 88 (D) 71

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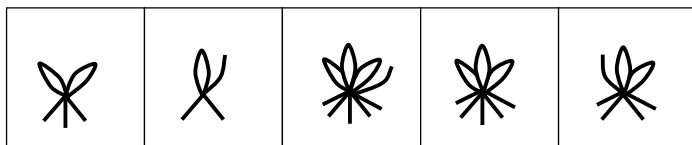
27. The mean temperature of Monday to Wednesday was 37°C and of Tuesday to Thursday was 34°C , if the temperature on Thursday was $\frac{4}{5}$ th that of Monday, then what was the temperature on Thursday?
 (A) 36.5°C (B) 36°C (C) 35.5°C (D) 34°C

28. In the given figure if Triangle represents healthy people, Rectangle represents old persons and Circle represents men then What is the number of those men who are healthy but not old ?

- (A) 3 (B) 4
 (C) 6 (D) 2

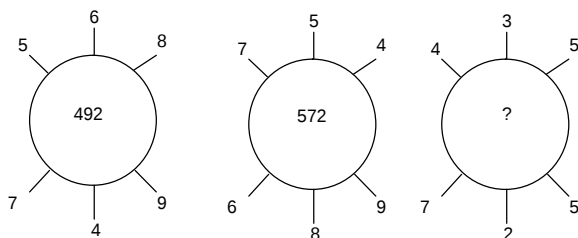


29. Find the odd one out



- (1) (2) (3) (4) (5)
 (A) 5 (B) 3 (C) 4 (D) 2

30. Which one will replace the question mark ?



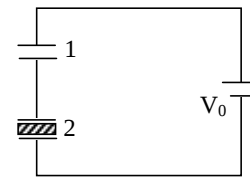
- (A) 115 (B) 130 (C) 135 (D) 140

Space for Rough Work

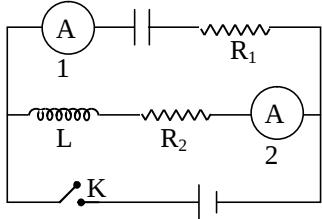
Physics**Section - II****Straight Objective Type**

Physics contains 30 multiple choice questions numbered 1 to 30. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

- Which of the following quantities related to a lens does not depend on the wavelength of the incident light?
(A) Refractive index (B) Focal length (C) Power (D) Radii of curvature
- Two cylinders A and B fitted with pistons contain equal amounts of an ideal diatomic gas at 300 K. The piston of A is free to move, while that of B is held fixed. The same amount of heat is given to the gas in each cylinder. If the rise in temperature of the gas in A is 30K, then rise in temperature of the gas in B is
(A) 30K (B) 18K (C) 50K (D) 42K
- Four particles, each of mass M and equidistant from each other, move along a circle of radius R under the action of their mutual gravitational attraction. The speed of each particle is
(A) $\sqrt{\frac{GM}{R}}$ (B) $\sqrt{2\sqrt{2}\frac{GM}{R}}$ (C) $\sqrt{\frac{GM}{R}(1+2\sqrt{2})}$ (D) $\frac{1}{2}\sqrt{\frac{GM}{R}(1+2\sqrt{2})}$
- Two identical capacitors 1 and 2 are connected in series. The capacitor 2 contains a dielectric slab of constant K as shown. They are connected to a battery of emf V_0 volts. The dielectric slab is then removed. Let Q_1 and Q_2 be the charge stored in the capacitors before removing the slab and Q_1' and Q_2' be the values after removing the slab. Then
(A) $\frac{Q_1'}{Q_1} = \left(\frac{K+1}{K}\right)$ (B) $\frac{Q_1'}{Q_2} = \frac{(K+1)}{2}$ (C) $\frac{Q_2'}{Q_2} = \frac{K+1}{2K}$ (D) $\frac{Q_1'}{Q_2} = \frac{K}{2}$
- Two short bar magnets have magnetic moments 1.20 Am^2 and 1.00 Am^2 respectively. They are placed on horizontal table parallel to each other with their north poles pointing towards the south. They have a common magnetic equator and are separated by a distance of 20.0 cm. The value of the resultant horizontal magnetic induction at the mid-point O of the line joining their centres is (horizontal component of the Earth's magnetic induction is $3.6 \times 10^{-5} \text{ Wb/m}^2$)
(A) $3.60 \times 10^{-5} \text{ Wb/m}^2$ (B) $2.56 \times 10^{-4} \text{ Wb/m}^2$ (C) $3.50 \times 10^{-4} \text{ Wb/m}^2$ (D) $5.80 \times 10^{-4} \text{ Wb/m}^2$



Space for Rough Work

6. Consider a two particle system with particles having masses m_1 and m_2 . If the first particle is pushed toward the centre of mass through a distance d , by what distance should the second particle be moved, so as to keep the centre of mass at the same position?
- (A) d (B) $\frac{m_2}{m_1}d$ (C) $\frac{m_1}{m_1 + m_2}d$ (D) $\frac{m_1}{m_2}d$
7. A particle of mass 10 gm moves in a field where potential energy per unit mass is given by expression $v = 8 \times 10^4 x^2$ erg/gm. If the total energy of the particle is 8×10^7 erg then the relation between x and time t is
- (A) $x = 10 \sin(400t + f)$ cm (B) $x = \sin(400t + f)$ m
(C) $x = 100 \sin(4t + f)$ m (D) $[f = \text{constant}]$
8. The average power transmitted by a progressive wave in term of standard notations is
- (A) $4\pi^2 A^2 \mu^{1/2} T^{-1/2} f^2$ (B) $2\pi^2 A^2 \mu^{1/2} T^{1/2} f^2$ (C) $2\pi^2 A^2 \mu T^{1/2} f^2$ (D) None
9. The binding energy per nucleon from deuterium (${}_1\text{H}^2$) and helium (${}_2\text{He}^4$) are 1.1 MeV and 7.0 MeV respectively. The energy released when two deuterium nucleus fuse to form a helium nucleus (${}_2\text{He}^4$) is
- (A) 28 MeV (B) 2.2 MeV (C) 23.6 MeV (D) 18.6 MeV
10. In the circuit given in figure 1 and 2 are ammeters. Just after key K is pressed to complete the circuit, the reading will be
- (A) zero in both (1) and (2)
(B) maximum in both (1) and (2)
(C) zero in (1) and maximum in (2)
(D) maximum in (1) and zero in (2)
- 
11. A parallel beam of light of intensity I is incident onto a perfectly reflecting plane mirror, at an angle of incidence θ . The pressure on the mirror due to radiation is
- (A) $\frac{2I}{c}$ (B) $\frac{2I}{c} \cos \theta$ (C) $\frac{2I}{c} \sin \theta$ (D) $\frac{2I}{c} \cos^2 \theta$

Space for Rough Work

12. In Young's double-slit experiment, one of the slits is wider than other so that the amplitude of the light from one slit is double of that from other slit. If I_m be the maximum intensity, the resultant intensity I when they interfere at phase difference ϕ is given by

(A) $\frac{I_m}{9}(4 + 5\cos\phi)$ (B) $\frac{I_m}{3}\left(1 + 2\cos^2\frac{\phi}{2}\right)$ (C) $\frac{I_m}{5}\left(1 + 4\cos^2\frac{\phi}{2}\right)$ (D) $\frac{I_m}{9}\left(1 + 8\cos^2\frac{\phi}{2}\right)$

13. A rod of pure silicon (resistivity ρ) is carrying a current. The electric field varies sinusoidally with time according to $E = E_0 \sin\omega t$, $\omega = 2\pi f$. At what frequency f would the maximum conduction and displacement current densities become equal if $\epsilon = \epsilon_0$ (which is not actually the case)?

(A) $\frac{1}{2\pi\rho\epsilon_0}$ (B) $\frac{2\pi}{\rho\epsilon_0}$ (C) $\frac{1}{\rho\epsilon_0}$ (D) $\frac{\pi}{\rho\epsilon_0}$

14. Three cylinders, all of mass M , roll without slipping down an inclined plane of height H . The cylinders are described as follows:

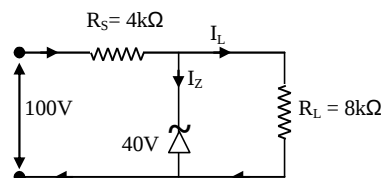
I. hollow of radius R II. solid of radius $\frac{R}{\sqrt{2}}$ III. solid of radius R

If all cylinders are released simultaneously from the same height, the cylinder (or cylinders) reaching the bottom first is (are):

(A) II (B) III (C) I and II (D) II & III

15. Figure shows Zener diode with a break down voltage of 40V connected to 100 V D.C. source with a series resistance R_s and a load resistor (R_L). Find the output voltage across R_L .

(A) 40V (B) 20V
(C) 50V (D) 60V



16. The density ρ of a piece of metal of mass ' m ' and volume V is given by the relation, $\rho = m/V$. If $m = (275.32 \pm 0.01)$ g and $V = (36.41 \pm 0.01)$ cm³, then the percentage error in ρ will be approximately:
- (A) 0.01% (B) 0.02% (C) 1% (D) 0.03%

Space for Rough Work

17. A tunnel is dug along the diameter of the earth. There is a particle of mass 'm' at the centre of the tunnel. Find the minimum velocity given to the particle so that it just reaches to the surface of the earth

(A) $\sqrt{\frac{GM}{R}}$

(B) $\sqrt{\frac{GM}{2R}}$

(C) $\sqrt{\frac{2GM}{R}}$

(D) it will reach with the help of negligible velocity

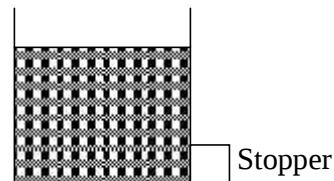
18. A stopper is used to block a small hole at the base of a vessel. Force exerted by liquid on stopper is F_1 . The stopper is then removed. Force experienced by vessel due to issuing liquid now is F_2 neglect atmospheric pressure, $F_1/F_2 = ?$

(A) 1

(B) 2

(C) $1/2$

(D) 4



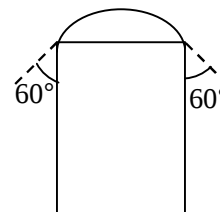
19. A soap bubble is being blown on a tube of radius 1 cm. The surface tension of the soap solutions is 0.05 N/m and the bubble makes an angle of 60° with the tube as shown. The excess of pressure over the atmospheric pressure in the tube is

(A) 5 Pa

(B) 1 Pa

(C) 10 Pa

(D) None of these



20. In a resonance tube experiment, the first two resonances are observed at length 10.5 cm and 29.5 cm. The third resonance is observed at the length _____ (cm).

(A) 47.5

(B) 58.5

(C) 48.5

(D) 82.8

21. Photons are incident from vacuum on a transparent material with a refractive index n for a given wavelength. Determine the momentum of the incident photon, if its wavelength in the material is equal to λ .

(A) nh/λ

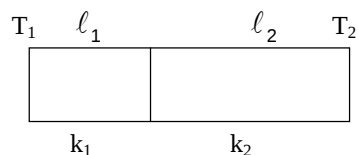
(B) h/λ

(C) $\frac{h}{n\lambda}$

(D) $h/\lambda (n+1)$

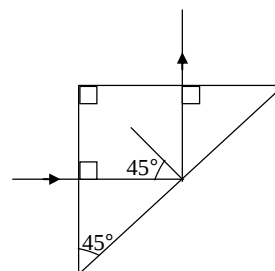
Space for Rough Work

22. One end of a thermally insulated rod is kept at a temperature T_1 and the other T_2 . The rod is composed of two sections of length ℓ_1 and ℓ_2 and thermal conductivities k_1 and k_2 , respectively. The temperature at the interface of the two sections is



- (A) $(k_2\ell_2T_1 + k_1\ell_1T_2)/(k_1\ell_1 + k_2\ell_2)$ (B) $(k_2\ell_1T_1 + k_1\ell_1T_2)/(k_2\ell_1 + k_1\ell_2)$
 (C) $(k_1\ell_2T_1 + k_2\ell_1T_2)/(k_1\ell_1 + k_2\ell_1)$ (D) $(k_1\ell_1T_1 + k_2\ell_2T_2)/(k_1\ell_1 + k_2\ell_2)$
23. A hot body, obeying Newton's law of cooling is cooling down from its peak value 80°C to an ambient temperature of 30°C . It takes 5 min in cooling down from 80°C to 40°C . How much time does it take to cool down from 62°C to 32°C ? (Given $\ln 2 = 0.693$, $\ln 5 = 1.609$)
 (A) 3.75 min (B) 8.6 min (C) 9.6 min (D) 6.5 min

24. A light ray is incident perpendicular on one face of a 90° prism and is totally internally reflected at the glass-air interface. If the angle of reflection is 45° , we conclude that the refractive index n



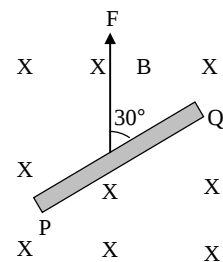
- (A) $n < \frac{1}{\sqrt{2}}$ (B) $n > \sqrt{2}$
 (C) $n > \frac{1}{\sqrt{2}}$ (D) $n < \sqrt{2}$
25. A charged particle P leaves the origin with speed $v = v_0$, at some inclination with the x-axis. There is uniform magnetic field B along the x-axis. P strikes a fixed target T on the x-axis for a minimum value of $B = B_0$. P will also strike T is
 (A) $B = 2B_0$, $v = 2v_0$ (B) $B = 2B_0$, $v = 3v_0$ (C) $B = B_0$, $v = 2v_0$ (D) $B = B_0/2$, $v = 2v_0$
26. Three capacitances, each of $3\ \mu\text{F}$, are provided. These cannot be combined to provide the resultant capacitance of
 (A) $1\ \mu\text{F}$ (B) $2\ \mu\text{F}$ (C) $4.5\ \mu\text{F}$ (D) $6\ \mu\text{F}$

Space for Rough Work

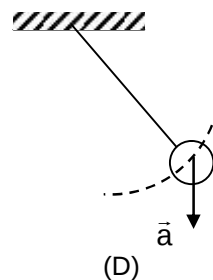
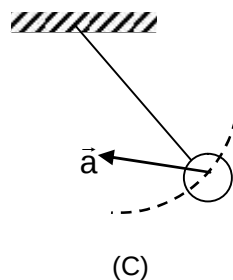
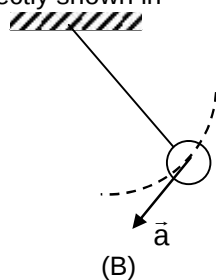
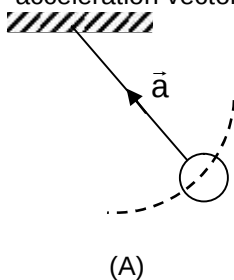
27. A particle is projected from the origin with a velocity of 10 m/s at 37° to horizontal in x-y plane. Another particle is simultaneously projected with velocity of 6 m/s in vertical y-direction. The path of 1st particle as seen by second is
 (A) parabola (B) vertical straight line
 (C) horizontal straight line (D) straight line inclined at an acute angle to the horizontal

28. A conducting rod of mass m and length l is placed on a smooth horizontal surface in a region where transverse uniform magnetic field B exists in the region. At $t = 0$, a constant force F starts acting on the rod at its mid point as shown. Potential difference between ends of the rod, $V_P - V_Q$ at any time t is

- (A) $\frac{BFlt}{2m}$ (B) $\frac{BFlt}{4m}$
 (C) $\frac{5BFlt}{8m}$ (D) $\frac{7BF/t}{8m}$

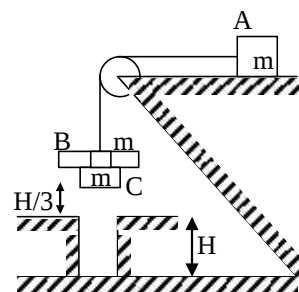


29. A simple pendulum is oscillating without damping when the displacement of bob is less than maximum, its acceleration vector $\vec{a}$ is correctly shown in



30. The system in figure is released from rest from the position shown. After blocks have moved distance $H/3$, collar B is removed and block A and C continue to move. What is the speed of C just before it strikes the ground. There is no friction anywhere. Neglect any impulse on string when B is stopped. Neglect size of collar and blocks.

- (A) $\sqrt{\frac{13gH}{9}}$ (B) $\frac{4}{3}\sqrt{gH}$
 (C) $2\sqrt{\frac{gH}{3}}$ (D) $\frac{\sqrt{10gH}}{3}$

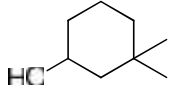


Space for Rough Work

Chemistry

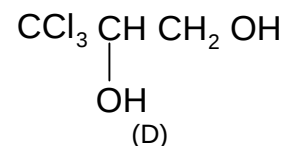
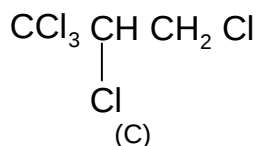
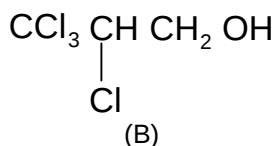
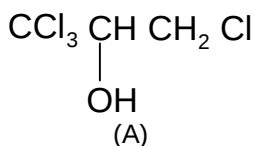
Straight Objective Type

Chemistry contains 30 multiple choice questions numbered 31 to 60. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

31. If the concentration of glucose ($C_6H_{12}O_6$) in blood is $0.9g\ L^{-1}$, what will be the molarity of glucose in blood?
 (A) 5M (B) 50M (C) 0.005M (D) 0.5M
32. Photoelectric emission is observed from a surface for frequencies ν_1 , and ν_2 of incident radiations ($\nu_1 > \nu_2$). If the maximum kinetic energy of photo electrons in the two cases are in the ratio of 1 : 2, then threshold frequency ν_0 is given by
 (A) $\nu_2 - \nu_1$ (B) $2\nu_1 - \nu_2$ (C) $2\nu_2 - \nu_1$ (D) $\frac{\nu_2 - \nu_1}{2}$
33. In lassaigine's test when both N and S are present, blood red colour obtained is due to the formation of
 (A) Ferric ferrocyanide (B) ferric sulphocyanide (C) Ferric cyanide (D) none
34. Number of angular nodes for 4d orbitals is:
 (A) 4 (B) 3 (C) 2 (D) 1
35. The IUPAC name of the compound  is:
 (A) 3, 3 – dimethyl -1 – hydroxycyclohexane (B) 1, 1- dimethyl -3 – hydroxy cyclohexane
 (C) 3, 3 – dimethyl – 1 – cyclohexanol (D) 1, 1 – dimethyl – 3- cyclohexanol
36. The first ionization enthalpies of Na, Mg, Al and Si are in the order:
 (A) $Na < Mg > Al < Si$ (B) $Na > Mg > Al > Si$ (C) $Na < Mg < Al < Si$ (D) $Na > Mg > Al < Si$
37. The solubility product of different sparingly soluble salts are
 (1) $XY = 4 \times 10^{-20}$ (2) $X_2Y = 3.2 \times 10^{-11}$ (3) $XY_3 = 2.7 \times 10^{-31}$
 The increasing order of solubility is
 (A) 1, 3, 2 (B) 2, 1, 3 (C) 1, 2, 3 (D) 3, 1, 2

Space for Rough Work

38. End product of this reaction is $\text{CCl}_3\text{CH}=\text{CH}_2 \xrightarrow{\text{Cl}_2/\text{H}_2\text{O}}$ A is



39. The ionic mobility of alkali metal ions in aqueous solution is maximum for:

(A) K^+

(B) Rb^+

(C) Li^+

(D) Na^+

40. The types of hybrid orbitals of nitrogen in NO_2^+ , NO_3^- and NH_4^+ respectively are expected to be:

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

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

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

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

41. NH_3 will form complex with:

(A) B_2H_6

(B) AgCl

(C) both

(D) None

42. One mol of RMgCl on reaction with one mol of SiCl_4 gives:

(A) RSiCl_3

(B) R_3SiCl

(C) R_2SiCl_2

(D) None

43. Which one of the following is paramagnetic?

(A) N_2

(B) NO

(C) CO

(D) O_3

44. Kidneys get damaged by water contaminated with

(A) Pb , Cd or Hg

(B) Ca , Sr or Ba

(C) Sulphates

(D) phosphates

45. The volume of a gas at 0°C is 273mL. Its volume at 1°C and same pressure will be:

(A) $\frac{274}{273}$ mL

(B) 274mL

(C) 272mL

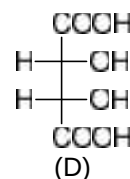
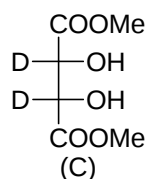
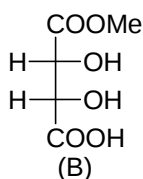
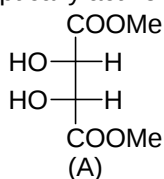
(D) $\frac{273}{274}$ mL

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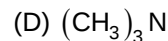
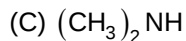
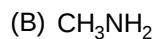
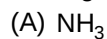
46. Formula for the coordination compound with IUPAC name Potassiumtrioxalatoaluminate(III) is.
(A) $K_2[Al(C_2O_4)_3]$ (B) $Al[K_3(C_2O_4)_3]$ (C) $K_3[Al(C_2O_4)_3]$ (D) $K[Al_2(C_2O_4)_3]$
47. On the basis of thermochemical equations (i), (ii) and (iii), find out which of the algebraic relationships given in options (a) to (d) is correct:
(i) $C(\text{graphite}) + O_2(g) \rightarrow CO_2(g); \Delta_r H = x \text{ kJ mol}^{-1}$
(ii) $C(\text{graphite}) + \frac{1}{2}O_2(g) \rightarrow CO(g); \Delta_r H = y \text{ kJ mol}^{-1}$
(iii) $CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g); \Delta_r H = z \text{ kJ mol}^{-1}$
(A) $z = x + y$ (B) $x = y - z$ (C) $x = y + z$ (D) $y = 2z - x$
48. Consider the reactions given below. On the basis of these reactions find out which of the algebraic relations given in options (a) and (d) is correct?
(i) $C(g) + 4H(g) \rightarrow CH_4(g); \Delta_r H = -x \text{ kJ mol}^{-1}$
(ii) $C(\text{graphite}) + 2H_2(g) \rightarrow CH_4(g); \Delta_r H = -y \text{ kJ mol}^{-1}$
(A) $x = y$ (B) $x = 2y$ (C) $x > y$ (D) $x < y$
49. Very pure nitrogen can be obtained by
(A) $Ba(N_3)_2 \xrightarrow{\Delta}$ (B) $(NH_4)_2Cr_2O_7 \xrightarrow{\Delta}$
(C) $NH_4NO_2 \xrightarrow{\Delta}$ (D) All
50. Which of the following will show geometrical isomerism?
(A) C_2H_5Br (B) $CH_2(COOH)_2$ (C) $(CH)_2(COOH)_2$ (D) C_2H_6

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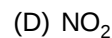
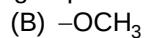
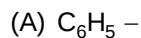
51. The optically active molecule is:



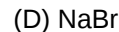
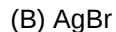
52. Among the following which one is most basic in aqueous solution?



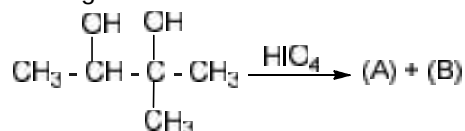
53. Maximum - I effect is exerted by the group:



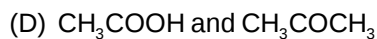
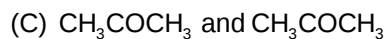
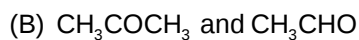
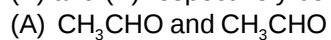
54. Which one of the following can show both frenkel as well as schokkydefect.



55. In the given reaction:

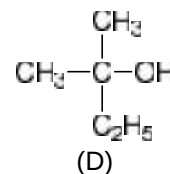
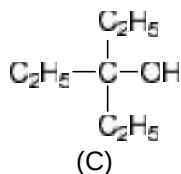
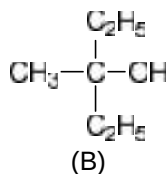
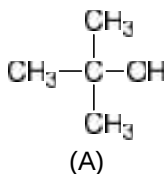


(A) and (B) respectively be:



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56. Methyl acetate on treating with excess of $\text{C}_2\text{H}_5\text{MgBr}$ produces:



57. The osmotic pressure of equi molar solutions of BaCl_2 , NaCl and glucose will be in the order

(A) Glucose > NaCl > BaCl_2

(B) BaCl_2 > NaCl > Glucose

(C) NaCl > BaCl_2 > Glucose

(D) NaCl > Glucose > BaCl_2

58. $\text{RMgX} \xrightarrow[\text{(ii) NH}_4\text{Cl}]{\text{(i) CH}_3\text{CN}} (\text{A}) \xrightarrow[\text{NH}_4\text{Cl}]{\text{RMgX}} (\text{B})$, (B) will be :

(A) 1° ROH

(B) 2° ROH

(C) 3° ROH

(D) Alkene

59. Which of the following mixture will lead to the formation of negatively charged colloid $[\text{AgI}] \text{I}^-$

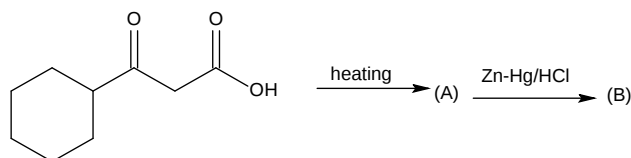
(A) 50 ml of 0.1 M AgNO_3 + 50 ml of 0.1 M KI

(B) 50 ml of 0.1 M AgNO_3 + 50 ml of 0.2 M KI

(C) 50 ml of 0.2 M AgNO_3 + 50 ml of 0.1 M KI

(D) 50 ml of 0.2 M AgNO_3 + 50 ml of 0.2 M KI

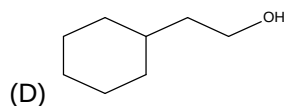
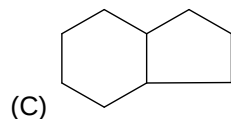
60.



In the above reaction Product B is

(A) Methyl cyclohexane

(B) ethyl cyclohexane

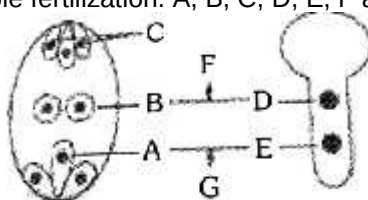


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Biology**Section - III****Straight Objective Type**

Biology contains 60 multiple choice questions numbered 1 to 60. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

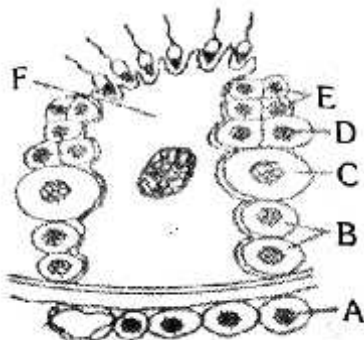
- Why Asexual reproduction is sometimes disadvantageous ?
 (A) It allows animals that do not move around to produce offsprings without finding mates
 (B) It allows an animal to produce many offspring quickly
 (C) It saves the time and energy of gamete production
 (D) It produces genetically uniform populations
- Parthenogamy represents the
 (A) Union of two vegetative nuclei
 (B) Union of two parent hyphae
 (C) Union of two gametes of one sex
 (D) Union of three gametes
- The given figure is associated to double fertilization. A, B, C, D, E, F and G are identified respectively



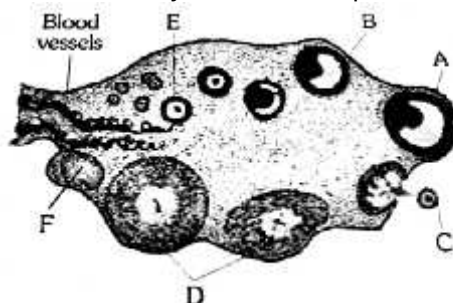
- For pollinated ovary which is correct ?
 (S) Accessory cells are diploid
 (B) Antipodal cells are haploid
 (C) Egg cell is diploid
 (D) Ovule cell is haploid

Space for Rough Work

5. The given figure is a portion of a seminiferous tubule identify A, B, C, D, E and F respectively



- (A) A – Leydig cell, B – Spermatogonium, C- Primary spermatocyte, D – Secondary Spermatocyte, E – Spermatozoa, F – Sertoli cells.
 (B) A – Leydig cells, B – Primary spermatocyte, C – Spermatogonium, D – Secondary spermatocyte, E – Spermatids, F – Sertoli cells
 (C) A – Sertoli cells, B – Spermatogonium, C – Primary Spermatocyte, D – Secondary spermatocyte, E – Spermatids, F – Leyding cells
 (D) A – Leydig cells, B – Spermatogonium, C – Primary spermatocyte, D – Secondary spermatocyte, E – Spermatids, F – Sertoli cells
6. The T.S of human ovary is given below. Identify the marked alphabets



- (A) A – Graafian follicle, B – Tertiary follicle with antrum, C – Ovum, D – Corpus luteum, E – Primary follicle, F – corpus albicans
 (B) A – Graafian follicle, B – Tertiary follicle with antrum, C – Ovum, D – Corpus albicans, E – Primary follicle, F – Corpus luteum
 (C) A – Graafian follicle, B – Tertiary follicle with antrum, C – Ovum, D – Corpus spongiosum, E – Primary follicle, F – Corpus albicans
 (D) A – Secondary follicle, B – Tertiary follicle with antrum, C – Ovum, D – Corpus luteum, E – Primary follicle, F – Corpus albicans

Space for Rough Work

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

Method

- A. The pill
B. Condom
C. Vasectomy
D. LNG – 20

Mode of Action

- (a) Prevents sperms reaching cervix
(b) Prevents implantation
(c) Prevents ovulation
(d) Semen contains no sperms

Matching:

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

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

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

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

8. Linkage decrease the frequency of

(A) Hybrid

(B) Dominant allele

(C) Recessive allele

(D) Both (a) and (b)

9. Alleles are

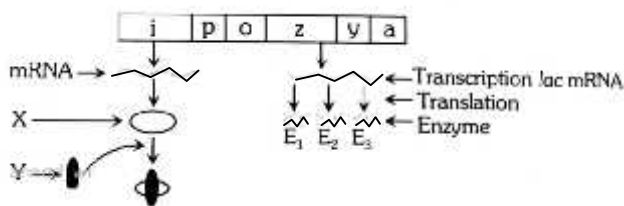
(A) Alternate forms of a gene

(B) Homologous chromosome

(C) Pair of sex chromosome

(D) None of the above

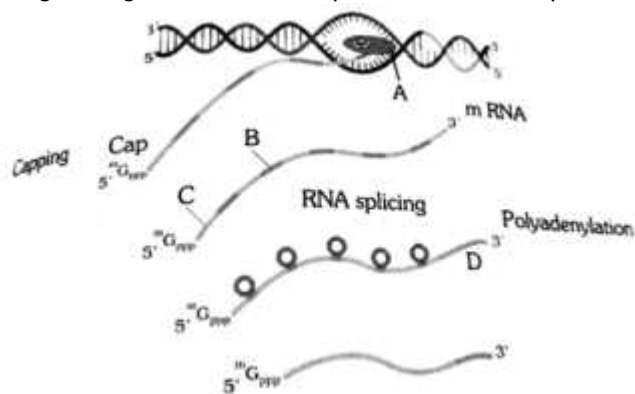
10. In the given figure of the lac operon, an operon for inducible enzymes, Identify components and enzymes



	X	Y	E ₁	E ₂	E ₃
(A)	Repressor protein	Inducer (lactose)	Permease	Transacteylase	β - Galactosidase
(B)	Repressor protein	Inducer (lactose)	β - Galactosidase	Transacetylase	Permease
(C)	Inducer (lactose)	Repressor protein	β - Galactosidase	Permease	Transacetylase
(D)	Repressor protein	Inducer (lactose)	β - Galactosidase	Permease	Transacetylase

Space for Rough Work

11. The given figure refers to the process of transcription in Eukaryotes, A, B, C, and D are respectively



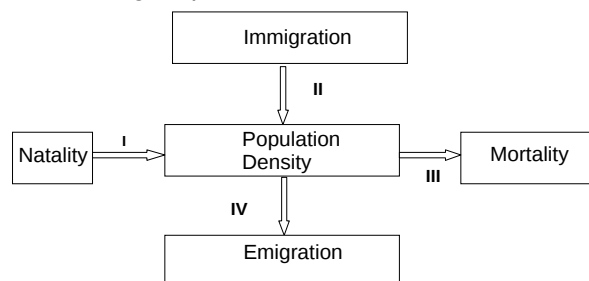
- (A) A – RNA polymerase II, B – Intron, C – Exon, D – Poly A tail
 (B) A – RNA polymerase III, B – Intron, C – Exon, D – Poly G tail
 (C) A – DNA polymerase II, B – Intron, C – Exon, D – Poly T tail
 (D) A – RNA polymerase I, B – Exon, C – Intron, D – Poly A tail
12. Evolution of different species in a given area starting from a point and spreading to other geographical areas is known as
 (A) Adaptive radiation (B) Natural selection (C) Migration (D) Convergent evolution
13. The recent ancestors of modern man were
 (A) Java ape man and Peking man (B) Peking man and Rhodesian Man
 (C) Rhodesian man and Cro-Magnon man (D) Cro-Magnon man and Neanderthal man
14. Haemozoin is a toxin substance formed in case of malaria. It is produced by
 (A) Globin protein of RBC (B) Colour pigment of RBC
 (C) Dead WBC (D) Parasite
15. A patient brought to a hospital with myocardial infarction is normally immediately given
 (A) Penicillin (B) Streptokinase (C) Cyclosporin-A (D) Statins
16. Cirrhosis of liver is caused by the chronic intake of
 (A) Opium (B) Alcohol (C) Tobacco (Chewing) (D) Cocaine

Space for Rough Work

17. Which one of the following chemical induces polyploidy in plant cells ?
 (A) 2, 4 – dichlorophenoxy acetic acid (B) Rifampicin
 (C) Cytokinin (D) Colchicine
18. Bombay green banana cultivation is the result of
 (A) Mass selection (B) Pureline selection (C) Clonal selection (D) Natural selection
19. A pearl oyster secretes pearls to
 (A) Regenerate injured parts (B) Protect itself against invading parasite
 (C) Harden its mantle cavity (D) Isolate damaged tissues of the body
20. *Monascus purpureus* is a yeast used commercially in the production of
 (A) Ethanol (B) Streptokinase for removing clots from blood vessels
 (C) Citric acid (D) Blood cholesterol lowering statins
21. During the process of isolation of DNA, chilled ethanol is added to
 (A) Precipitate DNA (B) Break open the cell to release DNA
 (C) Facilitate action of restriction enzymes (D) Remove proteins such as histones
22. Which of the following is correctly matched ?

(A)	<i>Agrobacterium tumefaciens</i>	-	Tumour
(B)	<i>Thermus aquaticas</i>	-	Bt-gene
(C)	pBR322	-	Enzyme
(D)	Ligase	-	Molecular scissors

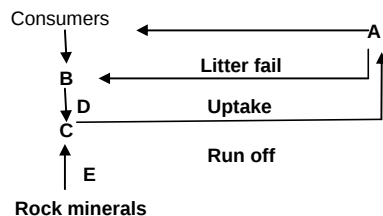
23. Select the right option in which I, II, III and IV are correctly identified



	I	II	III	IV
(A)	Increase	Decrease	Increase	Decrease
(B)	Decrease	Increase	Decrease	Increase
(C)	Increase	Increase	Decrease	Decrease
(D)	Decrease	Decrease	Increase	Increase

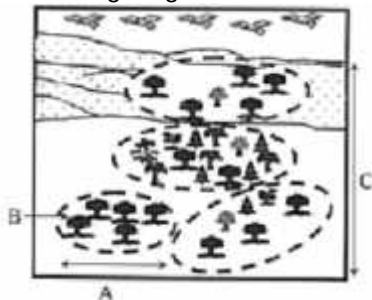
Space for Rough Work

24. A biologist studied the population of rats in a barn. He found that the average natality was 250, average mortality 240, immigration 20 and emigration 30. The net increase in populations is
 (A) Zero (B) 10 (C) 15 (D) 05
25. Identify which one of the following is an e.g of incomplete ecosystem ?
 (A) Grassland (B) Cave (C) River (D) Wetland
26. In the following simplified model of a nutrient cycle, identify A, B, C, D and E



	A	B	C	D	E
(A)	Producers	Soil solution	Detritus	Weathering	Decomposition
(B)	Production	Soil solution	Detritus	Decomposition	Weathering
(C)	Producers	Detritus	Soil solution	Weathering	Decomposition
(D)	Producers	Detritus	Soil solution	Decomposition	Weathering

27. Biodiversity of a geographical region represents
 (A) Genetic diversity present in the dominant species of the region
 (B) Species endemic to the region
 (C) Endangered species found in the region
 (D) The diversity in the organisms living in the region
28. The following diagrams show different types of diversity. Identify them



- (A) A - Beta diversity, B - Alpha diversity, C - Gamma diversity
 (B) A - Gamma diversity, B - Beta diversity, C - Alpha diversity
 (C) A - Gamma diversity, B - Alpha diversity, C - Beta diversity
 (D) A - Alpha diversity, B - Beta diversity, C - Gamma diversity

Space for Rough Work

29. Why is the concentration of ozone less over the north and south poles?
(A) CFCs accumulate only in area where the air is cold
(B) CFC use is highest in these areas
(C) CFCs stick to frozen water vapour and are able to act as catalysts
(D) UV rays are stronger in the atmosphere.
30. Science that deals with the study of external form, size, colour, structure and relative position of various parts of an organisms is known as
(A) Ecology (B) Taxonomy (C) Anatomy (D) Morphology
31. Which of the following are correctly matched with respect to their taxonomic classification ?
(A) Spiny anteater, sea urchin, sea cucumber – Echinodermata
(B) Flying fish, cuttlefish, silverfish – Pisces
(C) Centipede, millipede, spider, scorpion – Insecta
(D) Housefly, butterfly, Tsetsefly, silverfish – Insecta
32. Which of the following is not correctly matched for the organisms and its cell wall degrading enzyme?
(A) Fungi – Chitinase (B) Bacteria – Lysozyme
(C) Plant cells – Cellulase (D) Algae – Methylase
33. Elaters are present in sporogonium of
(A) *Riccia* (B) *Marchantia* (C) *Selaginella* (D) *Sphagnum*
34. Closed circulatory system occurs in
(A) Snail (B) Cockroach (C) Cuttle Fish (D) All the above
35. A special feature of Evisceration (Autoformy) is found in
(A) Chordata (B) Echinodermata (C) Annelida (D) Coelenterata
36. A fleshy – fruit with leathery exocarp is called
(A) Drupe (B) Berry (C) Pome (D) Hesperidium
37. Specialised parenchyma cells which store tannins, oil crystals of calcium oxalate are called
(A) Sclereids (B) Idioblasts (C) Stone cells (D) Conjunctive tissues
38. Earthworms have no skeleton but during burrowing, the anterior end becomes turgid and acts as a hydraulic skeleton. It is due to
(A) Gut peristalsis (B) Setae (C) Coelomic fluid (D) Blood

Space for Rough Work

39. Male and female cockroaches can be distinguished externally through
 (A) Anal styles in male (B) Anal cerci in female
 (C) Anal style and antennae in female (D) Both (a) and (c)
40. Disappearance of the tadpole tail during metamorphosis is brought about by
 (A) Endoplasmic reticulum (B) Golgi bodies (C) Lysosomes (D) Peroxisomes
41. According to mosaic model, plasma membrane is made up of
 (A) Cellulose and hemicellulose (B) Phospholipid and integrate protein
 (C) Phospholipid, extrinsic and intrinsic protein (D) Phospholipid and hemicellulose
42. Match the items in Column – I with those in Column – II and choose the correct answer
- | Column – I
(Biomolecules) | Column – II
(Examples) |
|------------------------------|---------------------------|
| (A) Carbohydrates | 1. Trypsin |
| (B) Protein | 2. Cholesterol |
| (C) Nucleic acid | 3. Insulin |
| (D) Lipid | 4. Adenylic acid |
- (A) A – 3, B – 1, C – 4, D – 2 (B) A – 2, B – 3, C – 4, D – 1
 (C) A – 3, B – 4, C – 1, D – 2 (D) A – 4, B – 1, C – 2, D – 3
43. DNA strands are antiparallel because of the presence of
 (A) H – bonds (B) Peptide bonds
 (C) Disulphide bonds (D) Phosphate-diester bonds
44. Select the correct option with respect to mitosis
 (A) Chromosomes move to the spindle equator and get aligned along equatorial plate in metaphase
 (B) Chromatids separate but remain in the centre of the cell in anaphase
 (C) Chromatids start moving towards opposite poles in telophase
 (D) Golgi complex and endoplasmic reticulum are still visible at the end of prophase



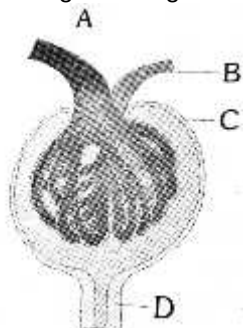
45. In which of the following the rate of transpiration is high?
 (A) CAM plants (B) C₃ plants (C) C₃ and C₄ plants (D) C₄ plants
46. Which of the following trace element is essential for auxin synthesis in plants ?
 (A) Molybdenum (B) Chlorine (C) Zinc (D) Boron

Space for Rough Work

47. Make suitable pair.
(A) Emerson effect (a) C_4 cycle
(B) Hill reaction (b) Photolysis
(C) Calvin's cycle (c) C_3 cycle
(D) Hatch - Slack cycle (d) Photosystem – I and II
- (A) Aa, Bb, Cc, Dd (B) Aa, Bc, Cd, Db (C) Ac, Bd, Ca, Db (D) Ad, Bb, Cc, Da
48. Photolysis of each water molecule in light reaction will yield
(A) 2 electrons and 4 protons (B) 4 electrons and 4 protons
(C) 4 electrons and 3 protons (D) 2 electrons and 2 protons
49. How many ATP are used in glycolysis OR For example complete phosphorylation of a glucose molecule, how many ATP molecules are required?
(A) 4 (B) 2 (C) 6 (D) 8
50. Which of the following hormones can replace vernalization ?
(A) Auxin (B) Ethylene (C) Gibberellins (D) Cytokinins
51. The sphincter of Oddi guards the
(A) Wirsung duct (B) Hepatopancreatic duct
(C) Bile duct (D) Cystic duct
52. Characteristic of mammalian liver is
(A) Kupffer's cells and leucocytes (B) Leucocytes and canaliculae
(C) Glisson's capsule and Kupffer cells (D) Glisson's capsule and leucocytes
53. Vital capacity of the lung includes
(or)
After forceful inspiration, the amount of air that can be breathed out by maximum forced expiration is equal to
(A) IRV + TV + ERV (B) ERV + RV (C) ERV + TV (D) IRV + TV
54. Pace maker (S. A Node) of the heart is situated
(A) In the wall of right atrium close to Eustachian valve
(B) On inter-auricular septum
(C) On inter-ventricular sepum
(D) In the wall of left atrium close to the opening of pulmonary veins

Space for Rough Work

55. The given diagram represents the Malpighian body. Identify A to D



- (A) A – Afferent arteriole, B – Efferent arteriole, C – Bowman's capsule, D – DCT
 (B) A – Afferent arteriole, B – Efferent arteriole, C- Bowman's capsule, D- Proximal convoluted tubule
 (C) A – Afferent arteriole, B- Efferent arteriole, C – renal corpuscle, D - Proximal convoluted tubule
 (D) A – Efferent arteriole, B – Afferent arteriole, C – Bowman's capsule, D – Proximal convoluted tubule
56. During muscles contraction
 (A) Chemical energy is changed into electrical energy
 (B) Chemical energy is changed into mechanical energy
 (C) Chemical energy is changed into physical energy
 (D) Mechanical energy is changed into chemical energy
57. Hypothalamus of the brain is not involved in this function
 (A) Sleep-wake cycle
 (B) Osmoregulation and thirst
 (C) Temperature control
 (D) Accuracy of muscular movement
58. Nissl's granules are presents in the and are made up of respectively
 (A) Muscle cells and deoxyribo nucleic acid
 (B) Mast cells and RNA
 (C) Osteocytes and DNA
 (D) Neuron and RNA
59. Which of the following hormones are produced in the hypothalamus and stored in posterior pituitary ?
 (A) FSH and LH
 (B) ADH and Oxytocin
 (C) TSH and STH
 (D) ACTH and MSH
60. The blood calcium level is lowered by the deficiency of
 (A) Both calcitonin and parathormone
 (B) Calcitonin
 (C) Parathormone
 (D) Calcitriol

Space for Rough Work
