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.

1. If form the English alphabet each third letter is deleted then which letter will be 7th to the right of the letter which is 11th from your right?
   (A) V   (B) U   (C) K   (D) I

   Arrange the words given below in a meaningful sequence.

2. 1. Word   2. Paragraph   3. Sentence   4. Letters   5. Phrase
   (A) 4, 1, 5, 2, 3   (B) 4, 1, 3, 5, 2   (C) 4, 2, 5, 1, 3   (D) 4, 1, 5, 3, 2

3. 1. Leaf   2. Fruit   3. Stem   4. Root   5. Flower
   (A) 3, 4, 5, 1, 2   (B) 4, 3, 1, 5, 2   (C) 4, 1, 3, 5, 2   (D) 4, 3, 1, 2, 5

   Directions(4-5):
   In each of the following questions find out the alternative which will replace the question mark.

4. 14 : 9 :: 26 : ?
   (A) 12   (B) 13   (C) 31   (D) 15

5. 27 : 125 :: 64 : ?
   (A) 162   (B) 216   (C) 517   (D) 273

6. If A means 'plus', B means 'minus', C means 'divided by' and D means 'multiplied by', then
   18 A 12 C 6 D 2 B 5 = ?
   (A) 15   (B) 25   (C) 27   (D) 17

7. If Q means 'add to', J means 'multiply by', T means 'substract from' and K means 'divide by' then
   30 K 2 Q 3 J 6 T 5 = ?
   (A) 18   (B) 28   (C) 31   (D) 103

8. A shepherd had 27 sheep. All but 10 died. How many he left with?
   (A) 10   (B) 15   (C) 17   (D) 27

Space for Rough Work

9. The number of boys in a class is three times the number of girls. Which one of the following numbers cannot represent the total number of children in the class ?
    (A) 48   (B) 44   (C) 42   (D) 40

10. Amit said - "This girl is the wife of the grandson of my mother". How is Amit related to the girl?
    (A) Brother   (B) Grandfather   (C) Husband   (D) Father-in-law

11. A's son B is married with C whose sister D is married to E the brother of B. How D is related to A?
    (A) Sister   (B) Daughter's-in-law   (C) Sister-in-law   (D) Cousin

12. A is the son of C; C and Q are sisters; Z is the mother of Q and P is the son of Z. Which of the following statements is true ?
    (A) P and A are cousins   (B) P is the maternal uncle of A
    (C) Q is the maternal grandfather of A   (D) C and P are sisters

13. Which of the following is not a leap year?
    (A) 700   (B) 800   (C) 1200   (D) 2000

14. Prasanna remembers that her mother's birthday falls on after 20th January, but before 24th January while his brother remembers that it falls after 22nd January but before 28th January when is prasanna's mother birthday
    (A) 23rd January   (B) 24th January   (C) 27th January   (D) None

Direction (15 to 17): Choose the one which does not belong to the group.

15. (A) AE   (B) AI   (C) IO   (D) EI

16. (A) IR   (B) ZA   (C) BY   (D) CM

17. (A) JAN 31   (B) MAY 31   (C) MAR 30   (D) JULY 31

Space for Rough Work

18. In a certain code, 'MUKESH' is written as 'PENOVK' and 'STOCK' as 'VWAFN'. How is 'KNIGHT' written in that code
    (A) NQUJKW   (B) NQAJKW   (C) HKUDEQ   (D) HKADEQ

19. In a certain code MORNING is written as SPNMFMH. How is SOULFUL written in that code?
    (A) VPTKKTE   (B) VPTKETK   (C) TPVKKTE   (D) TNRKMVG

20. Vinay moves towards South-East a distance of 14m. then he moves towards West and travels a distance of 28m. From here, he moves towards North-West a distance of 14m. and finally he moves a distance of 8m towards East and comes to a halt. How far is the starting point where he stood?
    (A) 20 m   (B) 22 m   (C) 6 m   (D) 8 m

21. From the word 'INTENSIFICATION', how many independent words can be made without changing the order of the letters and using each letter only once?
    (A) Four   (B) Five   (C) Six   (D) More than six

22. If South-East becomes North, North-East becomes west and so on. What will West become?
    (A) North-East   (B) North-West   (C) South-East   (D) South-West

23. If A x B means A is to the south of B; A + B means A is to the north of B; A % B means A is to the east of B; A - B means A is to the west of B; then in P % Q + R - S, S is in which direction with respect to Q?
    (A) South-West   (B) South-East   (C) North-East   (D) North-West

Space for Rough Work

DIRECTIONS(24-25): In each of the following questions, you are given a figure (X) followed by four alternative figures (1), (2), (3) and (4) such that figure (X) is embedded in one of them. Trace out the alternative figure which contains fig. (X) as its part.
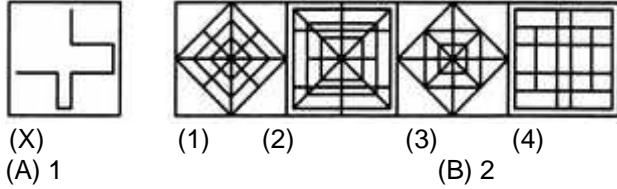
24.

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

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

25.

(X)   (1)   (2)   (3)   (4)
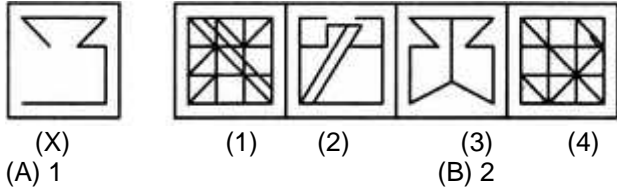
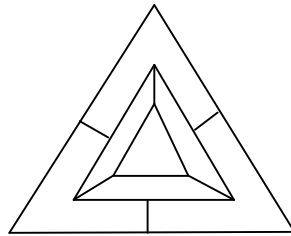(A) 1   (B) 2   (C) 3   (D) 4

26. What is the minimum number of different colours required to paint the given figure such that no two adjacent regions have the same colour?
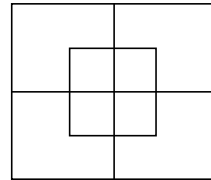
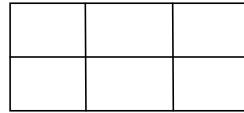(A) 3   (B) 4   (C) 5   (D) 6

Space for Rough Work

27. How many squares are there in the following figure ?
    (A) 8   (B) 9
    (C) 10   (D) 11

28. How many rectangles are there in the following figure ?
    (A) 18   (B) 19
    (C) 16   (D) 17

DIRECTION(29-30):Find the missing numbers in the following figures.

29.

2	3	5
3	4	5
5	7	6
38	74	?

   (A) 10   (B) 5   (C) 15   (D) none

30.

15   10   16   9   20   20

      215   247   ?

   (A) 340   (B) 420   (C) 380   (D) 400

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.

1. If momentum (p), area (A) and time (T) are taken to be fundamental quantities, then energy has the dimensional formula
   (A) $\left[pA^{-1}T^{1}\right]$ (B) $\left[p^{2}AT\right]$ (C) $\left[pA^{-1/2}T\right]$ (D) $\left[pA^{1/2}T^{-1}\right]$

2. Which of the following is a scalar quantity?
   (A) Displacement   (B) Electric field   (C) Acceleration   (D) Work

3. A block of mass 0.1 kg is held against a wall by applying a horizontal force of 5 N on the block. If the coefficient of friction between the block and the wall is 0.5., the magnitude of the frictional force acting on the block is
   (A) 2.5 N   (B) 0.98 N   (C) 4.9 N   (D) 0.49 N

4. The angle between the two vectors $\vec{A} = 3\hat{i} + 4\hat{j} + 5\hat{k}$ and $\vec{B} = 3\hat{i} + 4\hat{j} - 5\hat{k}$ is
   (A) 60°   (B) Zero   (C) 90°   (D) None of these

5. Figure shows the orientation of two vectors u and v in the xy-plane. If
   $u = a\hat{i} + b\hat{j}$ and $v = p\hat{i} + q\hat{j}$
   Which of the following is correct?
   (A) a and p are positive while b and q are negative
   (B) a, p and b are positive while q is negative
   (C) a, q and b are positive while p is negative
   (D) a, b, p and q are all positive

6. A particle of unit mass undergoes one-dimensional motion such that its velocity varies according to $v(x) = bx^{-2n}$ where b and n are constants and x is the position of the particle. The acceleration of the particle as the function of x, is given by :
   (A) $-2nb^{2}x^{-4n-1}$ (B) $-2b^{2}x^{-2n+1}$ (C) $-2nb^{2}e^{-4n+1}$ (D) $-2nb^{2}x^{-2n-1}$
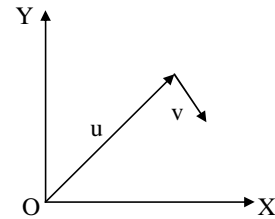
Space for Rough Work

7. If vectors $\vec{A} = \cos\omega t \hat{i} + \sin\omega t \hat{j}$ and $\vec{B} = \cos\dfrac{\omega t}{2}\hat{i} + \sin\dfrac{\omega t}{2}\hat{j}$ are functions of time, then the value of t at which they are orthogonal to each other is :

    (A) $t = \dfrac{\pi}{2\omega}$ (B) $t = \dfrac{\pi}{\omega}$ (C) $t = 0$ (D) $t = \dfrac{\pi}{4\omega}$

8. If the magnitude of sum of two vectors is equal to the magnitude of difference of the two vectors, the angle between these vectors is :
    (A) 0°   (B) 90°   (C) 45°   (D) 180°

9. The x and y coordinates of the particle at any time are $x = 5t - 2t^2$ and $y = 10 t$ respectively, where x and y are in meters and t in seconds. The acceleration of the particle at t = 2s is
    (A) 5 m/s^2 (B) –4 m/s^2 (C) –8 m/s^2 (D) 0

10. The component of a vector r along X-axis will have maximum value if
    (A) r is along positive Y-axis   (B) r is along positive X-axis
    (C) r makes an angle of 45° with the X-axis   (D) r is along negative Y-axis

11. The position vector of a particle $\vec{R}$ as a function of time is given by :
    $$\vec{R} = 4\sin(2\pi t)\hat{i} + 4\cos(2\pi t)\hat{j}$$

    Where R is in meter, t in seconds and $\hat{i}$ and $\hat{j}$ denote unit vectors along x-and y-directions, respectively.

    Which one of the following statements is wrong for the motion of particle?

    (A) Magnitude of acceleration vector is $\dfrac{v^2}{R}$, where v is the velocity of particle

    (B) Magnitude of the velocity of particle is 8 meter /second
    (C) path of the particle is a circle of radius 4 meter.
    (D) Acceleration vector is along $-\vec{R}$

Space for Rough Work

12. Two blocks of mass 6 kg and 4 kg connected by a rope of mass 2 kg are resting on a frictionless floor as shown in the following figure. If contact force of 60 N is applied to 6 kg block, the acceleration of the system is
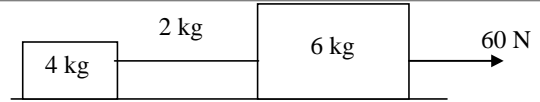
(A) 6 ms^{-2} (B) 5 ms^{-2} (C) 10 ms^{-2} (D) 15 ms^{-2}

13. Two blocks A and B of masses 3m and m respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively:

(A) $\frac{g}{3}$, g

(B) g, g

(C) $\frac{g}{3}, \frac{g}{3}$

(D) g, $\frac{g}{3}$
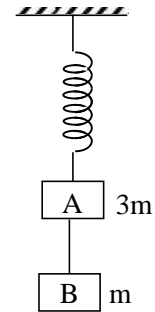
14. A car of mass m starts from rest and acquires a velocity along east, $\vec{v} = v\hat{i} \, (v > 0)$ in two seconds. Assuming the car moves with uniform acceleration, the force exerted on the car is

(A) $\frac{mv}{2}$ eastward and is exerted by the car engine

(B) $\frac{mv}{2}$ eastward and is due to the friction on the tyres exerted by the road

(C) more than $\frac{mv}{2}$ eastward exerted due to the engine and overcomes the friction of the road

(D) $\frac{mv}{2}$ exerted by the engine

Space for Rough Work

15. A body with mass 5 kg is acted upon by a force $\vec{F} = \left(-3\hat{i} + 4\hat{j}\right)N$. If its initial velocity at t = 0 is $v = \left(6\hat{i} - 12\hat{j}\right)ms^{-1}$, the time at which it will just have a velocity along the y-axis is

(A) never   (B) 10s   (C) 2s   (D) 15 s

16. A small block slides without friction inclined plane starting from rest. Let S_n be the distance travelled from time t = n − 1 to t = n. Then $\dfrac{S_n}{S_{n+1}}$ is

(A) $\dfrac{2n-1}{2n}$ (B) $\dfrac{2n+1}{2n-1}$ (C) $\dfrac{2n-1}{2n+1}$ (D) $\dfrac{2n}{2n+1}$

17. A system consists of three masses m_1, m_2 and m_3 connected by a string passing over a pulley P. The mass m_1 hangs freely and m_2 and m_3 are on a rough horizontal table (the coefficient of friction = μ). The pulley is frictionless and of negligible mass. The downward acceleration of mass m_1 is : (Assume $m_1 = m_2 = m_3 = m$)
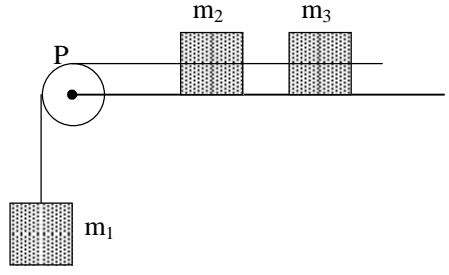
(A) $\dfrac{g(1-g\mu)}{g}$ (B) $\dfrac{2g\mu}{3}$

(C) $\dfrac{g(1-2\mu)}{3}$ (D) $\dfrac{g(1-2\mu)}{2}$

18. A plank with a box on it at one end is gradually raised about the other end. As the angle of inclination with the horizontal reaches 30° the box starts to slip and slides 4.0 m down the plank in 4.0 s. The coefficients of static and kinetic friction between the box and the plank will be, respectively:
(A) 0.6 and 0.5
(B) 0.5 and 0.6
(C) 0.4 and 0.3
(D) 0.6 and 0.6
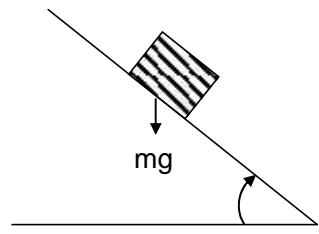
Space for Rough Work

19. Two particles of masses m and M (M > m) are connected by a cord that passes over a massless, frictionless pulley. The tension T in the string and the acceleration a of the particles is

(A) $T = \dfrac{2mM}{(M-m)}g; a = \dfrac{Mm}{(M+m)}g$

(B) $T = \dfrac{2mM}{(M+m)}g; a = \left(\dfrac{M-m}{(M+m)}\right)g$

(C) $T = \left(\dfrac{m-M}{(M+m)}\right)g; a = \left(\dfrac{Mm}{(M+m)}\right)g$

(D) $T = \left(\dfrac{mM}{(M+m)}\right)g; a = \left(\dfrac{2Mm}{(M+m)}\right)g$

20. A bullet of mass m is fired from a gun of mass M. The recoiling gun compresses a spring of force constant k by a distance d. Then the velocity of the bullet is

(A) $kd\sqrt{M/m}$ (B) $\dfrac{d}{M}\sqrt{km}$ (C) $\dfrac{d}{m}\sqrt{kM}$ (D) $\dfrac{kM}{m}\sqrt{d}$

21. If the momentum is increased by 20%, then kinetic energy increases by
(A) 44%   (B) 55%   (C) 66%   (D) 77%

22. Two particles A and B, move with constant velocities $\vec{v}_1$ and $\vec{v}_2$. At the initial moment their position vectors are $\vec{r}_1$ and $\vec{r}_2$ respectively. The condition for particles A and B for their collision is :

(A) $\vec{r}_1.\vec{v}_1 = \vec{r}_2.\vec{v}_2$

(B) $\vec{r}_1 \times \vec{v}_1 = \vec{r}_2 \times \vec{v}_2$

(C) $\vec{r}_1 - \vec{r}_2 = \vec{v}_1 - \vec{v}_2$

(D) $\dfrac{\vec{r}_1 - \vec{r}_2}{\left|\vec{r}_1 - \vec{r}_2\right|} = \dfrac{\vec{v}_2 - \vec{v}_1}{\left|\vec{v}_2 - \vec{v}_1\right|}$

23. A raindrop falling from a height h above ground, attains a near terminal velocity when it has fallen through a height (3/4) h. Which of the diagrams shown in figure correctly shows the change in kinetic and potential energy of the drop during its fall up to the ground?
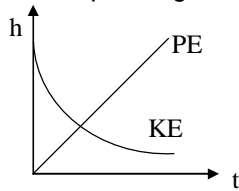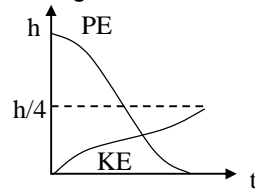
        (A)   (B)   (C)   (D)

Space for Rough Work

24. A body of mass 1 kg begins to move under the action of a time dependent force $\vec{F} = \left(2t\hat{i} + 3t^2\hat{j}\right)N$, where $\hat{i}$ and $\hat{j}$ are unit vectors along x and y axis. What power will be developed by the force at the time t?

(A) $\left(2t^2 + 3t^3\right)W$ (B) $\left(2t^2 + 4t^4\right)W$ (C) $\left(2t^3 + 3t^4\right)W$ (D) $\left(2t^3 + 3t^5\right)W$

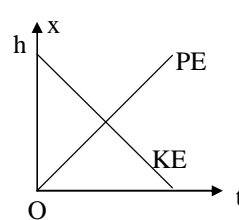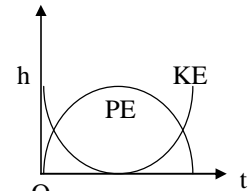25. A particle of mass m is driven by a machine that delivers a constant power of k watts. If the particle starts from rest the force on the particle at time t is

(A) $\sqrt{mk}\ t^{-1/2}$ (B) $\sqrt{2mk}\ t^{-1/2}$ (C) $\frac{1}{2}\sqrt{mk}\ t^{-1/2}$ (D) $\sqrt{\dfrac{mk}{2}}\ t^{-1/2}$

26. A ball is dropped from the roof of a tower of height h. The total distance converted by it in the last second of its motion is equal to the distance covered by it in first three seconds. The value of h in meters is: $\left(g = 10m/s^2\right)$

(A) 125   (B) 200   (C) 100   (D) 80

27. A player caught a cricket ball of mass 150 g moving at a rate of $20\ ms^{-1}$. If the catching processes is completed in 0.1sec, the force of the blow exerted by the ball on the hand of the player is equal to

(A) 30 N   (B) 300 N   (C) 150 N   (D) 5 N

28. A marble block of mass 2 kg lying on ice when given a velocity of $6\ ms^{-1}$ is stopped by friction in 10 sec. Then the co-efficient of friction is

(A) 0.06   (B) 0.01   (C) 0.02   (D) 0.03

29. A body projected up with a velocity u reaches height h. To reach double the height, it must be projected up with a velocity of:

(A) 2u   (B) $\dfrac{u}{2}$ (C) $\sqrt{2}$ (D) $\dfrac{u}{\sqrt{2}}$

30. A ball is released from the top of a tower of height 'h' metre. It takes 'T' seconds to reach the ground. What is the position of the ball in 'T/3' second?
(A) h/9 metre from the ground   (B) 7h/9 metre from the ground
(C) 8h/9 metre from the ground   (D) 17h/18 metre from the ground

Space for Rough Work

Chemistry

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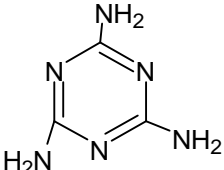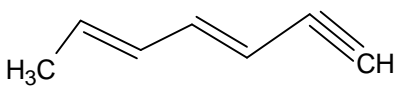
Chemistry contains 30 multiple choice questions numbered 31 to 60. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

31. The crystalline salt, $Na_2SO_4.x\ H_2O$ on heating loses 55.9% of its weight. The formula of the crystalline salt is:
    (A) $Na_2SO_4.\ 5H_2O$ (B) $Na_2SO_4.\ 7H_2O$ (C) $Na_2SO_4.\ 10H_2O$ (D) $Na_2SO_4.\ 6H_2O$

32. Which of the following represents the formula of a substances which contains about 26% nitrogen and 74% oxygen?
    (A) N_2O (B) NO (C) NO_2 (D) N_2O_5

33. 280mL of sulphur vapour at NTP weigh 3.2 g. The molecular formula of the sulphur vapour is:
    (A) S_6 (B) S_2 (C) S_4 (D) S_8

34. A gas is found to have the formula $(CO)_x$. Its V.D. is 70. The value of x must be:
    (A) 7   (B) 4   (C) 5   (D) 6

35. An oxide of iodine (I = 127) contains 25.4 gram of iodine and 8 grams of oxygen. Its formula could be:
    (A) I_2O_3 (B) I_2O (C) I_2O_5 (D) I_2O_7

36. If work function of a metal plate is 5 eV, find the threshold wavelength.
    (A) $\lambda_0 = 2.484 \times 10^{-3} m$ (B) $\lambda_0 = 2.484 \times 10^{-7} m$
    (C) $\lambda_0 = 2.484 \times 10^{-1} m$ (D) $\lambda_0 = 2.484 \times 10^{15} m$

Space for Rough Work

37. What is the maximum number of lines obtained when the excited electron of a H atom in n=6 drops to the ground state?
(A) 16   (B) 14   (C) 15   (D) 17

38. In the Rydberg equation, a spectral line corresponds to $n_1 = 3$ and $n_2 = 5$. Calculate the frequency of this spectral Line.
(A) $2.33 \times 10^{15} s^{-1}$ (B) $2.34 \times 10^{-14} s^{-1}$ (C) $2.34 \times 10^{14} s^{-1}$ (D) $2.34 \times 10^{15} s^{-1}$

39. What transition in the hydrogen spectrum would have the same wavelength as the Balmer transition *n=4* to *n=2* of He^+ spectrum.
(A) $n_1 = 1$ And $n_2 = 2$ (B) $n_1 = 2$ and $n_2 = 1$ (C) $n_1 = 3$ and $n_2 = 2$ (D) $n_1 = 2$ and $n_2 = 3$

40. In hydrogen atom, energy of the first excited state is -3.4 eV. Then find out the K.E. of the same orbit of H atom.
(A) + 3.4 eV   (B) + 6.8 eV   (C) -13.6 eV   (D) + 13.6 eV

41. The correct order of atomic size of C, N, P, S follows the order:
(A) N < C < S < P   (B) N< C < P < S   (C) C < N < S < P   (D) C < N < P < S

42. The first ionization potential of Na is 5.1 eV. The value of electron gain enthalpy of $Na+$ will be:
(A) -2.55ev   (B) -5.1eV   (C) -10.2eV   (D) $+2.55eV$

Space for Rough Work

43. Smallest among these species is:
    (A) Lithium   (B) lithium ion   (C) hydrogen   (D) helium

44. Which among of the following has the highest ionization potential?
    (A) B   (B) Li (C) Ne (D) F

45. $As_2O_3 + H_2O \rightarrow AsO_4^{-3} + H^+$, in the reaction n factor of As_2O_3 is
    (A) 1   (B) 2   (C) 3   (D) 4

46. The total number of lone pairs of electrons in melamine is
    (A) 4   (B) 7   (C) 6   (D) 9

47. The number of π bonds in
    (A) 2   (B) 5   (C) 4   (D) 3

48. The oxidation number of nitrogen atoms in NH_4NO_3 are
    (A) +6, +6   (B) +6, +4   (C) -3, +5   (D) +5, +3

49. In which of the following pairs of molecules /ions both the species are not likely to exist?
    (A) H_2^+, He_2^{2-} (B) H_2^-, He_2^{2-} (C) H_2^{2+}, He_2 (D) H_2^-, He_2^{2+}

Space for Rough Work

50. Which one of the following molecules is spected to exhibit diamagnetic behavior?
    (A) C_2 (B) $N_2{}^+$ (C) O_2 (D) S_2

51. The constant 'a' in van der waals' equation is maximum for
    (A) Helium   (B) Hydrogen   (C) Oxygen   (D) Ammonia

52. The average velocity of an ideal gas at $0°C$ is $0.4\,ms^{-1}$. Its average velocity at $546°C$ will be
    (A) $0.8\,ms^{-1}$ (B) $1.6\,ms^{-1}$ (C) $0.69\,ms^{-1}$ (D) $0.346\,ms^{-1}$

53. Van der Waals' equation for n moles of a gas is:
    (A) $\left(P + \dfrac{n^2a}{V^2}\right)(V - nb) = nRT$ (B) $\left(P + \dfrac{na}{V^2}\right)(V - nb) = RT$

    (C) $\left(P + \dfrac{a}{V^2}\right)(V - b) = nRT$ (D) $\left(P + \dfrac{n^2a}{V^2}\right)(V - b) = RT$

54. The compressibility factor (Z) of one mole of a van der Waals gas of negligible 'a' value is
    (A) 1 (B) $\dfrac{bp}{RT}$ (C) $1 + \dfrac{bp}{RT}$ (D) $1 - \dfrac{bp}{RT}$

55. Amongst $NO_3^-, AsO_3^{3-}, CO_3^{2-}, ClO_3^-, SO_3^{2-}$ and BO_3^{3-} the non-planar species are
    (A) AsO_3^{3-}, ClO_3^- and SO_3^{2-} (B) CO_3^{2-}, BO_3^{3-} and NO_3^-
    (C) CO_3^{2-}, AsO_3^{3-} and BO_3^{3-} (D) NO_3^-, ClO_3^- and BO_3^{3-}

Space for Rough Work

56. The largest oxidation number exhibited by an element depends on its outer electronic configuration. With which of the following outer electronic configurations the element will exhibit largest oxidation number?

(A) $3d^1 4s^2$ (B) $3d^3 4s^2$ (C) $3d^5 4s^1$ (D) $3d^5 4s^2$

57. Consider the following reaction, $xMnO_4^- + yC_2O_4^{2-} + zH^+ \longrightarrow xMn^{2+} + 2yCO_2 + \dfrac{z}{2}H_2O$. The value of x, y and z in the reaction respectively are

(A) 5,2 and 16 (B) 2,5 and 8 (C) 2,5 and 16 (D) 5,2 and 8

58. Oxidation state of nitrogen is incorrectly given for

Compound	Oxidation state
(i) $\left[Co(NH_3)_5 Cl\right]Cl_2$	0
(ii) NH_2OH	-1
(iii) $(N_2H_5)_2 SO_4$	-2
(iv) Mg_3N_2	-3

(A) i (B) ii (C) iii (D) iv

59. Identify disproportionate reaction

(A) $CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$ (B) $CH_4 + 4Cl_2 \longrightarrow CCl_4 + 4HCl$

(C) $2F_2 + 2OH^- \longrightarrow 2F^- + OF_2 + H_2O$ (D) $2NO_2 + 2OH^- \longrightarrow NO_2^- + NO_3^- + H_2O$

60. Plot of Maxwell's distribution of velocities is given below:
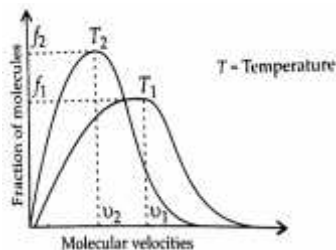
Which of the following is correct about this plot?

(A) $T_1 < T_2$ (B) $f_1 > f_2$ (C) $\upsilon_1 < \upsilon_2$ (D) None of these

Space for Rough Work

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.

1. An important function of botanical garden is
   (A) Providing beautiful area for recreation
   (B) One can observe tropical plants over there
   (C) They allow ex-situ conservation of germplasm.
   (D) They provide natural habitat to wildlife.
.
2. Species which are sexually potential but living in different geographical areas are
   (A) Sibling species
   (B) Morpho species
   (C) Sympatric species
   (D) Allopatric species.

3. A group of actually or potentially interbreeding populations that reproductively isolated from other such group can reproduce freely with each other and form zygote is referred to as
   (A) order
   (B) parasexual hybridisation
   (C) genus
   (D) species

4. The corrosive sublimate (chemical) used in preserving plant herbarium specimen is
   (A) Cupric chloride   (B) Mercuric acetate   (C) Cuprous chloride   (D) Mercuric chloride

5. Nuclear membrane is absent in.
   (A) Penicillium   (B) Volvox   (C) Nostoc   (D) Agaricus

6. Single-celled eukaryotes are included in
   (A) Fungi   (B) Monera   (C) Protista   (D) Archaea

7. Certain RNA viruses carry an enzyme that uses viral RNA as a template in the synthesis of DNA. This enzyme is
   (A) Viral nuclease
   (B) RNA replicase
   (C) RNA polymerase
   (D) Reverse transcriptase

Space for Rough Work

8. Prions are infectious agents associated with mad cow disease. These agents are
    (A) DNA   (B) RNA   (C) Proteins   (D) All of these

9. Naked cytoplasm, multinucleated and saprophytic thalloid body of a slime moulds (myxomycetes) are known as
    (A) sporangium   (B) plasmodium   (C) thallus   (D) prothallus

10. The Cell Wall of bacterium is made up of_____
    (A)carbohydrates   (B) peptidoglycans   (C) polysaccharides   (D) cellulose

11. Cyanobacteria are used in agricultural fields for crop improvement because they cause……………………..
    (A) Nitrogen fixation   (B) for efficient mineral absorption
    (C) increase oxygen   (D) kills insects and pests

12. Agar agar is obtained from
    (A) Gelidium   (B) Polysiphonia   (C) Ectocarpus   (D) Chara

13. A fem (Pteropsida) showing Heterospory and seed habit
    (A) Selaginella   (B) Lycopodium   (C) Marsilea   (D) Pistia

14. Multicellular asexual buds formed in the receptacle in the thallus of liverworts are
    (A) Gemmae   (B) gemma Cup   (C) Zoosporangium   (D) Gametangium

15. Ovule of Cycas is also known as
    (A) Megasporangium   (B) Macrosporangium   (C) Microsporangium   D) sporophylls

16. A living fossil among the gymnosperm is
    (A) Rhbynia   (B) Psilotum   (C) Lepidodendon   (D) Gingko

17. Fusion of male gamete with the egg and another male gamete with the secondary polar nuclei in angiosperms
    respectively result in the formation of
     (A) Embryo and Endosperm   (B) Zygote and endosperm
    (C) PEN and Zygote   (D) Zygote and Endosperm

18. Advanced Oogamy is the feature of
    (A) Chlorophyceae   (B) Paheophyceae   (C) Rhodophyceae   (D) Cyanophyceae

19. Correct sequence of layers of bacterial cell envelope from periphery to the cell is
    (A) cell membrane $\rightarrow$ glycocalyx $\rightarrow$ cell wall   (B) glycocalyx $\rightarrow$ cell wall $\rightarrow$ cell membrane
    (C) glycocalyx $\rightarrow$ cell membrane $\rightarrow$ cell wall   (D) cell wall $\rightarrow$ glycocalyx $\rightarrow$ cell membrane

Space for Rough Work

20. Identify the option that has all Cellular organelles with membranes
    (A) endoplasmic reticulum, ribosomes and nuclei
    (B) lysosomes, Chloroplast and mitochondria
    (C) nuclei, ribosomes and mitochondria
    (D) chromosomes, ribosomes and endoplasmic reticulum

21. DNA is not present in
    (A) nucleus   (B) mitochondria   (C) chioroplast   (D) ribosomes.

22. Nuclear envelope is also known as
    (A) Karyotheca   (B) Nucleolemma.   (C) Nuclear membrane (D) All of these

23. The hollow tube-like channel that is paired with a stack of thylakoids (Granum) is referred to as
    (A) stromal lamellae   (B) stroma   (C) cristae   (D) grana.

24. Select the correct matching in the following pairs
    (A) Rough ER — Synthesis of glycogen   (B) Rough ER — Oxidation of fatty acids
    (C) Smooth ER — Oxygen synthesis   (D) Smooth ER —Synthesis of lipids

25. The chromosomes in which centromere is situated close to one end are
    (A) telocentric   (B) sub-metacentric   (C) metacentric   (D) acrocentric.

26. One of the following is an organelle of bacteria that appears as an invagination of the plasma membrane and functions either in DNA replication and cell division or excretion of exoenzymes.?
    (A) Glycogen granule   (B) Mesosome
    (C) Phosphate granule   (D) Cyanophycean granule

27. The polymers of tubulin that form part of the cytoskeleton and provide structure and shape to the cytoplasm of eukaryotic cells are known as
    (A) microtubules   (B) microfilaments
     (C) intermediate filaments   (D) lamins.

28. Which of the following Organelles are semi-autonomous?
    (A) mitochondria   (B) vacuoles   (C) Chloroplasts   (D) Both A & C

Space for Rough Work

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29. One of the following does not differ in *E.coli* and *Chlamydomonas*?
    (A) Ribosomes   (B) Chromosomal organization
    (C) Cell wall   (D) Cell membrane.

30. One of the following structures between two adjacent plant cells is an effective transport pathway. That is
    (A) plasmodesmata   (B) plastoquinones
    (C) endoplasmic reticulum   (D) plasmalemma.

31. An elaborate network of filamentous proteinaceous structures present in the cytoplasm which help in the maintenance of cell shape is called
    (A) thylakoid   (B) endoplasmic reticulum   (C) plasmalemma   (D) cytoskeleton

32. In germinating seeds fatty acids are degraded exclusively by the
    (A) peroxisomes   (B) mitochondria   (C) proplastids   (D) glyoxysomes.

33. Vacuole in a plant cell
    (A) lacks membrane and contains air
    (B) lacks membrane and contains water and excretory substances
    (C) is membrane-bound and contains Toxic substances
    (D) is membrane-bound & the membrane is called Tonoplast.

34. The two sub-units of ribosome remain united at a critical ion level of
    (A) magnesium   (B) calcium   (C) copper   (D) manganese.

35. Chlorophyll in chloroplasts is located in
    (A) grana and stromal lamellae   (B) grana
    (C) stroma   (D) both grana and stroma

Space for Rough Work

36. Chemiosmotic theory of ATP synthesis in the chloroplasts and mitochondria is based on
    (A) membrane potential   (B) accumulation of Na ions
    (C) accumulation of K ions   (D) proton gradient

37. Which statement is wrong about viruses?
    (A) All are parasites.
    (B) Antibiotics have no effect on them.
    (C) They have ability to synthesize nucleic acids and proteins
    (D) A few viruses are beneficial to man as they yield single celled proteins

38. Which of the following statements are true for eukaryotic cells?
    (i) They do not have a nuclear membrane.   (ii) They have a well organised nucleus.
    (iii) They have a nuclear membrane.   (iv) Blue green algae are eukaryotic cells.
    (A) ii and iv   (B) ii and iii   (C) i and ii   (D) i and iv

39. The separation of homologous chromosomes is complete at which stage of Prophase-I of Meiosis-I?
    (A) Pachytene   (B) Zygotene   (C) Diplotene   (D) Diakinesis

40. Archaeopteryx is connecting link between
    (A) Reptiles and Birds   (B) Reptiles and Mammals
    (C) Fishes and Reptiles   (D) Chordates and Non chordates

41. Pouched mammals are known as
    (A) Prototherians   (B) Metatherians   (C) Eutherians   (D) Therians

42. Sponges capture food with the help of
    (A) Pinacocytes   (B) Choanocytes   (C) Trophocytes   (D) Theocytes

43. The complex formed by a pair of synapsed homologous chromosomes is called
    (A) bivalentand dyad   (B) bivalent and tetrad
    (C) equatorial plate   (D) kinetochore.

44 During meiosis I, the chromosomes start pairing at
    (A) Zygotene   (B) Pachytene   (C) Diplotene   (D) Leptotene.

45. During the metaphase stage of mitosis, spindle fibres attach to chromosomes at
    (A) Kinetochore
    (B) both centromere and kinetochore
    (C) centromere, kinetochore and areas adjoining centromeres
    (D) centromere

Space for Rough Work

46. Meiosis II performs
    (A) separation of sex chromosomes   (B) synthesis of DNA and centromere
    (C) separation of homologous chromosomes   (D) separation of chromatids.

47. Plasmolysis in a plant cell is defined as
    (A) break down (lysis) of plasma membrane in hypotonic medium
    (B) shrinkage of cytoplasm in hypertonic medium
    (C) Lysis of cell wall
    (D) None of the above
.
48. Which of the events listed below is not observed during mitosis?
    (A) Chromatin condensation
    (B) Movement of centrioles to opposite poles
    (C) Appearance of chromosomes with two chromatids joined together at the centromere.
    (D) Crossing over

49. In meiosis, the daughter cells differ from parent cell as well as amongst themselves due to
    (A) segregation, independent assortment and crossing over (B) segregation only
    (C) independent assortment only   (D) None of these.

50. Longest Phase of the cell cycle is the
    (A) Interphase   (B) M-Phase   (C) G_0 Phase   (D) All of the above

51. Presence of chlorophyll a, c fucoxanthin with mannitol and laminarin as reserve food material are characteristics of
    (A) Rhodophyceae   (B) Phaeophyceae   (C) Chlorophyceae   (D) Cyanophycease

52. A bivalent of meiosis-I consists of
    (A) Two chromatids and one centromere   (B) Two chromatids and two centromeres
    (C) Four chromatids and two centromeres   (D) Four chromatids and four centromeres

53. Algae have cells made up of
    (A) cellulose, galactans and mannans   (B) hemicelluloses and proteins
    (C) cellulose, and proteins   (D) cellulose and hemicelluloses

Space for Rough Work

54. In Sycon the larva is
    (A) Trocophore   (B) Parenchymula   (C) Redia   (D) Amphiblastula

55. Claspers are present on:
    (A) Pectoral fins of male Chondrichthyes   (B) Caudal fins of female Chondrichthyes
    (C) Pelvic fins of male Chondichthyes   (D) Dorsal fins of male Osteichthyes

56. Haemocoel is found in
    (A) *Hydra and Aurelia*   (B) *Taenia and Ascaris*
    (C) *Cockroach and Pila*   (D) *Herdmania and Balanoglossus*

57. Aquatic reptiles are
    (A) Ureotelic   (B) Ureotelic on land   (C) Ammonotelic   (D) Uricotelic in water

58. The long bones are hollow and connected by air passage. They are characteristic of
    (A) Aves   (B) Mammalia   (C) Reptilian   (D) Sponges

59. Female Ascaris is differentiable from male in
    (A) Presence of cloaca   (B) Presence of pineal setae
    (C) Shorter size   (D) Straight posterior end

60. Cnidoblasts in hydra helps in:
    (A) Food capture   (B) Defense   (C) Both A & B   (D) None of the above

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