SKVedge

Sample Paper

(Class XI studying moving to Class XII)

(Engineering)

IMPORTANT INSTRUCTIONS

A. GENERAL:

- Please read the instructions given for each question carefully and mark the correct answers against the question numbers on the answer sheet in the respective subjects.
- Duration of Test is 1 Hour.
- This Test contains 40 questions divided in 3 sections. Section I contains questions of Physics and Section II contains questions of Chemistry and Section III contains questions of Mathematics.
- Maximum marks are 80.

B. MARKING SCHEME :

Each subject in this paper consists of following 3 types of sections :-

SECTION – I

- The section contains **13** questions.
- Each question has four options. ***Only one*** of the four option is correct.
- For each question, marks will be awarded in one of the following categories :
  Full Marks : +2, If only the correct options is marked.
  Zero Marks : 0, In all other cases.

SECTION – II

- The section contains **13** questions.
- Each question has four options. ***Only one*** of the four option is correct.
- For each question, marks will be awarded in one of the following categories :
  Full Marks : +2, If only the correct options is marked.
  Zero Marks : 0, In all other cases.

SECTION - III

- The section contains **14** questions.
- Each question has four options. ***Only one*** of the four option is correct.
- For each question, marks will be awarded in one of the following categories :
  Full Marks : +2, If only the correct options is marked.
  Zero Marks : 0, In all other cases.

All the Best!

Section – I (Physics)

1. Relative accuracy of a screw gauge can be increased
   (a) by taking large number of observations
   (b) by having a device free from zero error
   (c) by increasing the size of pitch
   (d) by increasing the number of divisions on the circular scale
2. The instrumental error can be caused due to :
   (a) wrong setting of the instrument
   (b) the wrong procedure of handling the instrument
   (c) lack of concentration of observer
   (d) faulty construction of the instrument
3. The SI unit of power is :
   (a) joule (b) newton
   (c) watt (d) erg
4. A ball is thrown vertically upward with an initial velocity of 150 m/s. The ratio of velocity after 3 s and 5 s is $\frac{x+1}{x}$. The value of x is _____. Take ($g = 10\ m/s^2$).
   (a) – 5 (b) 5 (c) 6 (d) 10
5. The position of a particle related to time is given by $x = (5t^2 - 4t + 5)m$. The magnitude of velocity of the particle at t = 2s will be:
   (a) 14 m/s (b) 16 m/s (c) 10 m/s (d) 6 m/s
6. A motor boat is to reach at a point 30^o upstream on other side of a river flowing with velocity 5 m/s. Velocity of motor boat with respect to water is $5\sqrt{3}$ m/sec. The driver should steer the boat at an angle:
   (a) 150^o w.r.t. stream direction (b) 60^o w.r.t. normal to the bank
   (c) 120^o w.r.t. stream direction (d) 30^o w.r.t. the line of destination from starting point
7. A man is at a height of 100 m. He sees a car which makes an angle of $\frac{\pi}{6}$ with man's position. If the car moves to a point where angle is $\frac{\pi}{3}$, what is the distance moved by it?
   (a) $\left(\frac{100}{\sqrt{3}}\right)$ m (b) $\left(200\sqrt{3}\right)$ m
   (c) $\left(\frac{200}{\sqrt{3}}\right)$ m (d) $\left(\frac{150}{\sqrt{3}}\right)$ m
8. A spring balance and a physical balance are kept in a lift. In these balances, equal masses are placed. If now the lift starts moving upwards with constant acceleration, then
   (a) The reading of spring balance will increase and the equilibrium position of the physical balance will disturb
   (b) the reading of spring balance will increase and the physical balance will remain in equilibrium
   (c) the reading of spring balance will remain unchanged and physical balance will remain in equilibrium
   (d) the reading of spring balance will decrease and physical balance will remain in equilibrium
9. A ball of mass m is thrown upwards with a velocity v. If air exerts an average resisting force F, the velocity with which the ball returns to the thrower is :

(a) $v\sqrt{\frac{F}{mg+F}}$ (b) $v\sqrt{\frac{mg-F}{mg+F}}$

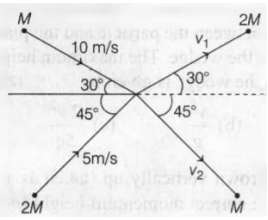
(c) $v\sqrt{\frac{mg}{mg+F}}$ (d) $v\sqrt{\frac{mg+F}{mg}}$

10. Consider a block, which is released from rest from the top of a smooth inclined plane of angleθ_1 reaches the bottom in time t_1. The same block released from rest from the top of another smooth inclined plane of angle θ_2, reaches the bottom in time t_2. If the two inclined planes have the same heights, then relation between t_1, and t_2 is :

(a) $\frac{t_2}{t_1} = \left(\frac{\sin\theta_1}{\sin\theta_2}\right)$ (b) $\frac{t_2}{t_1} = \left(\frac{\sin\theta_1}{\sin\theta_2}\right)^{1/2}$

(c) $\frac{t_2}{t_1} = \left(\frac{\sin\theta_1}{\sin\theta_2}\right)^{2}$ (d) $\frac{t_2}{t_1} = 1$

11. Two particles of masses M and 2M moving as shown, with speeds of 10 m/s and 5 m/s, collide elastically at the origin. After the collision, they move along the indicated directions with speed v_1 and v_2 are nearly



(a) 6.5 m/s and 6.3 m/s (b) 6.5 m/s and 3.2 m/s

(c) 3.2 m/s and 6.3 m/s (d) 3.2 m/s and 12.6 m/s

12. A body of mass 10 kg is moved with uniform speed on a rough horizontal surface, for a distance of 2 m. The work done is 150 J. The surface is inclined to the horizontal at 30°. The same body is moved over the inclined plane for a distance of 2 m. The work done against friction will be: (Take g = 10 ms^{-2})

(a) $75\sqrt{3}$ J (b) 150 J (c) 250 J (d) 50 J

13. A blacksmith carries a hammer on his shoulder and holds it at the other end of its light handle in his hand. If he changes the point of support of the handle and x is the distance between his hand and the point of support, then the pressure on his hand is proportional to:

(a) x (b) $\frac{1}{x^2}$ (c) x^2 (d) $\frac{1}{x}$

Section – I (Chemistry)

14. The percentage composition of carbon by mole in methane is

(a) 75% (b) 20% (c) 25% (d) 80%

15. 1.6 g of an unknown gas occupies 2.24 L of volume under STP conditions. The gas may be _____.

(a) CO (b) CO_2 (c) CH_4 (d) SO_2

16. You are provided two aqueous solutions A (500 mL of 5 M) and B (500 mL of 2M) of NaOH. If solutions of A and B are to be used in appropriate amount to prepare maximum volume V mL of 3M solution of NaOH, what is the value of V?

(a) 1000 mL (b) 800 mL (c) 750 mL (d) 500 mL

17. 2 g of metal carbonate is neutralised completely by 100 mL of 0.1 NHCl. The equivalent mass of metal carbonate is:

(a) 150 (b) 100 (c) 200 (d) 50

18. The ratio mass of oxygen and nitrogen of a particular gaseous mixture is 1: 4. The ratio of number of their molecule is

(a) 3 : 16 (b) 1 : 8 (c) 1 : 4 (d) 7 : 32

19. The difference between the radii of 3^{rd} and 4^{th} orbits of Li^{2+} is ΔR_1 .The difference between the radii of 3^{rd} and 4^{th} orbits of He^{+} is ΔR_2 . Ratio $\Delta R_1 : \Delta R_2$ is:

(a) 2 : 3 (b) 8 : 3 (c) 3 : 2 (d) 3 : 8

20. Energy of an electron is given by $E = -2.178 \times 10^{-18} J \left(\frac{Z^2}{n^2}\right)$

Wavelength of light required to excite an electron in an hydrogen atom from level n = 1 to n = 2 will be

(h = 6.62×10^{-34} Js and c = 3.0×10^{8} ms $^{-1}$)

(a) 6.500×10^{-7} m

(b) 1.214×10^{-7} m

(c) 8.500×10^{-7} m

(d) 2.816×10^{-7} m

21. The atoms have an outer electronic configuration s^2 , p^1 and they show mono - valency, they belong to :

(a) boron family elements (b) halogen family elements

(c) alkali metals (d) Transition metals

22. Which of the following does not reflect the periodicity of elements?

(a) Electronegativity (b) Neutron/proton ratio

(c) Bonding behavior (d) Ionization potential

23. Complex A has a composition of $H_{12}O_6Cl_3Cr$. If the complex on treatment with conc. H_2SO_4 loses 13.5% of its original mass, the correct molecular formula of A is :

[Given: atomic mass of Cr = 52 amu and Cl = 3 amu]

(a) $[Cr(H_2O)_5Cl]Cl_2 \cdot H_2O$ (b) $[Cr(H_2O)_4Cl_3]Cl \cdot 2H_2O$

(c) $[Cr(H_2O)_3Cl_3] \cdot 3H_2O$ (d) $[Cr(H_2O)_6]Cl_3$

24. The boiling point of p - nitrophenol is higher than that of o - nitrophenol because:

(a) NO_2 group at p - position behave in a different way from that at o - position.

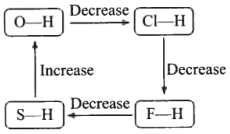
(b) There is intermolecular hydrogen bonding in p - nitrophenol

(c) Intramolecular hydrogen bonding exists in p - nitrophenol

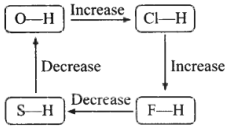
(d) p - nitrophenol has a higher molecular weight

25. Which of the following diagrams shows CORRECT change in the polarity of bond?

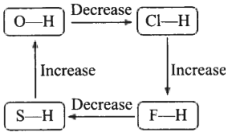
(a)



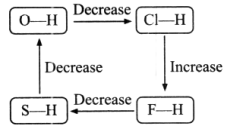
(b)



(c)

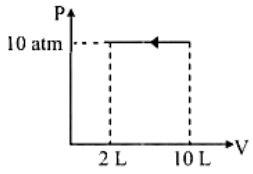


(d)

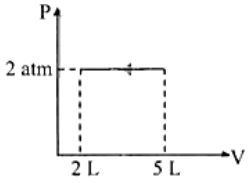


26. Consider the following graphs (not to the scale) that represent the pressure - volume work when one mole of an ideal gas is compressed isothermally by constant external pressure in a single step. The magnitude of work obtained is highest in the pressure - volume work represented by graph _____.

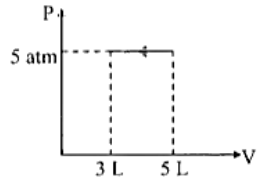
(A)



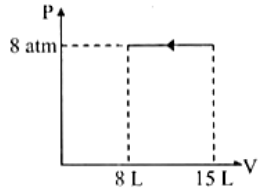
(B)



(C)



(D)



(a) Option C (b) Option D (c) Option B (d) Option A

Section – III (Mathematics)

27. If X= {4^n - 3n - 1: n ∈ N}and Y = {9 (n - 1) : n ∈ N}, where N is the set of natural numbers, then X ∪ Y is equal to:

(a) Y (b) Y – X (c) N (d) X

28. The number of x ∈ [0, 2 π] for which $\left|\sqrt{2\sin^4 x + 18\cos^2 x} - \sqrt{2\cos^4 x + 18\sin^2 x}\right| = 1$ is

(a) 2 (b) 6 (c) 8 (d) 4

29. If A, B, C, D are the angles of a cyclic quadrilateral, then cos A + cos B + cos C + cos D =

(a) 0 (b) 2(cos A + cos C)

(c) 2(cos A + cos D) (d) 2(cos A + cos B)

30. In a triangle, the sum of two sides is x and the product of the same two sides is y. If x^2 - c^2 = y, where c is the third side of the triangle, then the ratio of the inradius to the circumradius of the triangle is

(a) $\frac{3y}{2x(x+c)}$ (b) $\frac{3y}{2c(x+c)}$ (c) $\frac{3y}{4x(x+c)}$ (d) $\frac{3y}{4c(x+c)}$

31. The complex number z satisfying |z - 1| = |z - 3| = |z - i| is

(a) 2 + I (b) $\frac{3}{2}+\frac{1}{2}i$ (c) 2 + 2i (d) None of these

32. If the complex number$z$ satisfy the relation $\frac{z-2}{z} = i\tan(\arg z)$ then z lies on;

(a) ellipse (b) straight line (c) parabola (d) circle

33. If for a complex number$z = x + $ iy amp $\frac{z-1}{z+1} = \frac{\pi}{4}$, then maximum value of $|z|$ is

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

34. The number of values of x that satisfy the equation$\log_{2x-1}\left(\frac{x^4+2}{2x+1}\right) = 1$ is:

(a) 1 (b) 2 (c) 3 (d) 4

35. If the equation $x^3 + 3x + 1 = 0$ has three real roots x_1, x_2, x_3, then the value of $(\{x_1\} + \{x_2\} + \{x_3\})$ is equal to:

[Note: {x} denotes the fractional part of x.]

(a) $\frac{3}{2}$ (b) 2 (c) $\frac{5}{2}$ (d) 1

36. If A =$\{x \in R: |x| < 2\}$ and B = $\{x \in R: |x-2| \geq 3\}$; then:

(a) A ∩ B = (– 2, – 1) (b) A – B = [– 1, 2)

(c) A ∪ B = R – (2, 5) (d) B – A = R – (– 2, 5)

37. A relation on the set A =$\{x: |x| < 3, x \in Z\}$, where Z is the set of integers is defined by R ={ $(x, y): y = |x|, x \neq -1$ }.Then the number of elements in the power set of R is:

(a) 32 (b) 16 (c) 64 (d) 8

38. IfP_n denotes the product of all the binomial coefficients of $(1+x)^n$ and 9! $P_{n+1} = 10\ {}^9P_n$, then n is equal to

(a) 19 (b) 9 (c) 10 (d) None of these

39. The letters of the word OUGHT are written in all possible ways and these words are arranged as in a dictionary, in a series. Then the serial number of the word TOUGH is:

(a) 89 (b) 84 (c) 79 (d) 86

40. For a, b > 0, let g_1 ; g_2 , g_3 and g_4 be geometric means between a and b, then theroots of the equation $(g_2g_3)x^2$ - $\left(\frac{g_2}{g_1+g_3}\right)x - g_1g_4 = 0$ are:

(a) both positive (b) both negative

(c) one negative and one positive (d) imaginary

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
(d)	(d)	(c)	(b)	(b)	(c)	(c)	(b)	(b)	(a)
11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
(a)	(a)	(d)	(b)	(c)	(c)	(c)	(d)	(a)	(b)
21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
(a)	(b)	(b)	(b)	(c)	(d)	(a)	(c)	(a)	(b)
31.	32.	33.	34.	35.	36.	37.	38.	39.	40.
(c)	(d)	(d)	(a)	(d)	(d)	(b)	(b)	(a)	(c)