EXCEL (12TH) ISMART SAMPLE PAPER

(Non-Medical)

Test ID : 00000000

Time : 90 min. M. Marks: 210

The Test Consists (TOTAL 45 QUESTIONS)		
SUBJECTS	**Qs.**	**SYLLABUS**
PHYSICS	15	Units & Dimensions, Kinematics, Newton's Laws of Motion, Work Power Energy, Circular Motion, Rotational Motion
CHEMISTRY	15	Atomic Structure, Mole Concept, Periodic Classification, Chemical Bonding, Redox Reactions
MATHEMATICS	15	Sets, Quadratic Equations, Binomial Theorem, Sequence and Series, Complex Numbers, Trigonometry

INSTRUCTIONS TO CANDIDATE

- Please read the instructions given for each question carefully and fill the correct answer against the question numbers on the answer sheet in the respective subject.
- **Use ball point pen to darken the appropriate circle & mark should completely fill the circle.**
- The Question paper contains blank spaces for your rough work. No additional sheet will be provided for rough work.
- Blank papers, Clipboards, Log Tables, Slide rule, Calculators, Cellular phones, Pagers and Electronic gadgets in any form are not allowed.
- Write your Name, Student ID in the block at the top of the Answer Sheet. Also write your Name & Student ID in the space provided on this cover page of question paper.

Name:_____**Student ID**_____

Physics

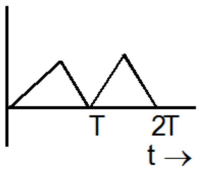
Objective Questions [+4, –1]

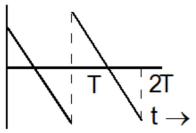
1. The ratio of the average velocity of a train during a journey to the maximum velocity between two stations is

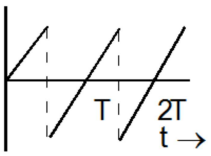
(A) =1 (B) >1

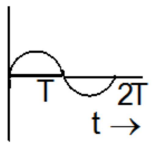
(C) <1 (D) > or < 1

2. A ball is dropped from certain height on a glass floor so that it rebounds elastically to the same height. If the process continues, the velocity-time graph for such a motion would be

(A) 

(B) 

(C) 

(D) 

3. The displacement of a particle is given by $y = a + bt + ct^2 - dt^4$. The initial velocity and acceleration are respectively

(A) $b, -4d$ (B) $-b, 2c$

(C) $b, 2c$ (D) $2c, -4d$

4. P represents radiation pressure, c represents speed of light and S represents radiation energy striking unit area per sec. The non-zero integers x, y and z such that $P^x S^y c^z$ is dimensionless are :

(A) $x = 1, y = 1, z = 1$ (B) $x = -1, y = 1, z = 1$

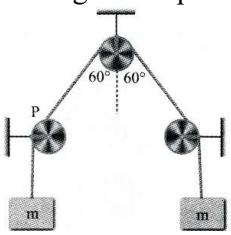
(C) $x = 1, y = -1, z = 1$ (D) $x = 1, y = 1, z = -1$

5. If $\hat{\mathbf{i}}$, $\hat{\mathbf{j}}$ and $\hat{\mathbf{k}}$ are unit vectors along x, y and z-axes respectively, the angle θ between the vector $\hat{\mathbf{i}} + \hat{\mathbf{j}} + \hat{\mathbf{k}}$ and vector $\hat{\mathbf{i}}$ is given by

(A) $\theta = \cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$ (B) $\theta = \sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

(C) $\theta = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$ (D) $\theta = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

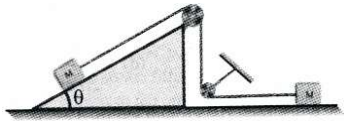
6. Two blocks of mass m each is connected with the string which passes over fixed pulleys, as shown in figure. The force exerted by the string on the pulley P is :



(A) mg (B) $2mg$

(C) $\sqrt{2}mg$ (D) $4mg$

7. Two blocks, each having a mass M, rest on frictionless surface as shown in the figure. If the pulleys are light and frictionless, and M on the incline is allowed to move down, then the tension in the string will be :



(A) 2.3 $Mg \sin\theta$ (B) $\frac{3}{2}Mg \sin\theta$

(C) $\frac{Mg}{2}\sin\theta$ (D) $2\ Mg \sin\theta$

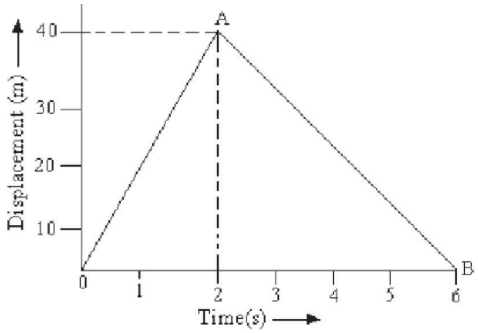
8. A particle is projected up along a rough plane of inclination 45° with the horizontal. If the coefficient of friction is 0.5, the retardation is (g = acceleration due to gravity)

(A) $\frac{g}{2}$ (B) $\frac{g}{2\sqrt{2}}$

(C) $\frac{3g}{2\sqrt{2}}$ (D) $\frac{g}{\sqrt{2}}$

9. A ball is thrown downwards with velocity v from the top of a tower and it reaches the ground with speed $3v$. What is the height of the tower?
(A) v^2/g (B) $2v^2/g$
(C) $4v^2/g$ (D) $8v^2/g$

10. The displacement-time graph of a motion is shown in Fig. The ratio of the magnitudes of the speeds during the first two seconds and the next four seconds is



(A) 1 : 1 (B) 1 : 2
(C) 2 : 1 (D) 1 : $\sqrt{2}$

INTEGER

ANSWER TYPE [0 : For incorrect Ans.]
MARKING SCHEME : [+6 : For correct Ans.]
This section contains **5** questions. The answer to each of the questions is a **single digit integer,** ranging from 0 to 9. The bubble corresponding to the correct integer is to be darkened in the ORS.

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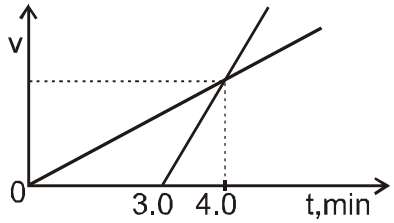
11. A car moving with a speed of 40 km/h can be stopped by applying brakes after at least 2 m. If the same car is moving with a speed of 80 km/h, what is the minimum stopping distance ? [in metres]

12. The drawing shows velocity (v) versus time (t) graphs for two cyclists moving along the same straight segment of a highway from the same point. The first cyclist starts at t = 0 min and the second cyclist starts moving at t = 3.0 min. The time (in minutes) at which the two cyclists meet is : (Both velocity-time curves intersect at t = 4 min)



13. The relation $3t = \sqrt{3x} + 6$ describes the displacement of a particle in one direction where x is in *metres* and t in sec. The displacement, when velocity is zero, is (in metres)

14. A particle is projected from the ground with an initial velocity of 20 m/s at an angle of 30° with horizontal. The magnitude of change in velocity in a time interval from t = 0 to t = 0.5 s is : (g = 10 m/s^2) (in m/s)

15. If $\vec{A} = 5\hat{i} + 7\hat{j} - 3\hat{k}$ and $\vec{B} = 2\hat{i} + 2\hat{j} - c\hat{k}$ are perpendicular vectors, the value of c is:

CHEMISTRY

Objective Questions [+4, –1]

16. The energies E_1 and E_2 of two radiations are 25 eV and 50eV respectively. The relation between their wavelengths i.e., λ_1 and λ_2 will be

(A) $\lambda_1 = \frac{1}{2}\lambda_2$ (B) $\lambda_1 = \lambda_2$

(C) $\lambda_1 = 2\lambda_2$ (D) $\lambda_1 = 4\lambda_2$

17. A hydrogen atom sample in the ground state is excited by monochromatic radiation of wavelength λÅ. The resulting spectrum consists of maximum 15 different lines. What is the wavelength λ?
($R_H = 109737\ cm^{-1}$)

(A) 937.3 Å (B) 1025 Å

(C) 1236 Å (D) 1537 Å

18. The angular momentum of electron H-atom is proportional to

(A) r^2 (B) 1/r

(C) $\sqrt{r}$ (D) $\frac{1}{\sqrt{r}}$

19. The maximum number of elements is 3rd period is :

(A) 8 (B) 18

(C) 32 (D) between 8 and 18

20. Which of the following contains the largest number of carbon atoms?

(A) 0.10 mol of acetic acid, CH_3COOH (B) 0.25 mol of carbon dioxide, CO_2

(C) 0.050 mol of glucose, $C_6H_{12}O_6$ (D) 0.0010 mol of sucrose, $C_{12}H_{22}O_{11}$

21. Commercially available concentrated HCl contains 38.0% HCl by mass (density = 1.19 g mL^{-1}). What is molarity of the solution? (At. mass of Cl = 35.5)

(A) 10.40 M (B) 5.70 M

(C) 12.38 M (D) 13.46 M

22. Correct statement regarding molecules SF_4, CF_4 and XeF_4 are :

(A) 2, 0 and 1 lone pairs of central atom respectively (B) 1, 0 and 1 lone pairs of central atom respectively

(C) 0, 0 and 2 lone pairs of central atom respectively (D) 1, 0 and 2 lone pairs of central atom respectively

23. A standard solution of 0.165 M HCl is being used to determine the concentration of an unknown NaOH solution. If 25.5 mL of an acid solution are required to neutralize 15.0 mL of the base, what is the molarity of the NaOH solution?

(A) (0.165) / (25.5 + 15.0) M (B) (15.0) / (0.165) (25.5) M

(C) (0.165) (15.0 / 25.5) M (D) (0.165) (25.5 / 15.0) M

24. Calculate the number of photons of light of wavelength 3960 Å necessary to provide 1 J of energy.

(A) 2×10^{20} (B) 2×10^{16}

(C) 2×10^{15} (D) 2×10^{18}

25. A dye absorbs a photon of wavelength λ and re-emits the same energy into two photons of wavelengths λ_1 and λ_2 respectively. The wavelength λ is related with λ_1 and λ_2 as :

(A) $\lambda = \frac{\lambda_1 + \lambda_2}{\lambda_1\lambda_2}$ (B) $\lambda = \frac{\lambda_1\lambda_2}{\lambda_1+\lambda_2}$

(C) $\lambda = \frac{\lambda_1^2\lambda_2^2}{\lambda_1+\lambda_2}$ (D) $\lambda = \frac{\lambda_1\lambda_2}{(\lambda_1+\lambda_2)^2}$

INTEGER

ANSWER TYPE [0 : For incorrect Ans.]

MARKING SCHEME : [+6 : For correct Ans.]

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26. The sum of number of neutrons and protons in all of the isotopes of hydrogen is :-

27. Calculate the number of waves made by a Bohr electron in one complete revolution in n^{th} orbit of H-atom. If ratio of de-Broglie wavelength associated with electron moving in n^{th} orbit and 2^{nd} orbit is 1.5

28. The maximum number of electrons that can have principal quantum number, $n = 3$ and spin quantum number, $m_s = -1/2$, is

29. The ratio of unpaired electrons present in *d* orbitals of Co^{2+} and Cr^{3+} is ___.

30. A compound H_2X with molar weight of 80 g is dissolved in a solvent having density of 0.4 g mL^{-1}. Assuming no change in volume upon dissolution, the molality of a 3.2 molar solution is

MATHEMATICS

Objective Questions [+4, –1]

31. In a factory 70% of the workers like oranges and 64% like apples. If x% like both oranges and apples, then

(A) $x \geq 34$ (B) $x \leq 64$

(C) $34 \leq x \leq 64$ (D) None of these

32. The value of $\frac{\log_3 5 \times \log_{25} 27 \times \log_{49} 7}{\log_{81} 3}$ is

(A) 1 (B) 6

(C) $\frac{2}{3}$ (D) 3

33. The first, second and last terms of an A.P. are α, β, γ respectively then the sum of first *n* terms is

(A) $\beta + \gamma - 2\alpha$ (B) $\frac{\beta + \gamma - 2\alpha}{\beta - \alpha}$

(C) $\frac{\beta + \gamma + 2\alpha}{\beta + \alpha}$ (D) $\frac{(\alpha + \gamma)(\beta + \gamma - 2\alpha)}{2(\beta - \alpha)}$

34. If a, b, c are real and in A.P. and a^2, b^2, c^2 are in H.P., then

(A) $a = b = c$ (B) $2b = 3a + c$

(C) $b^2 = \sqrt{ac/8}$ (D) None of these

35. If $x^2 + 2ax + 10 - 3a > 0$ for all $x \in R$, then

(A) $-5 < a < 2$ (B) $a < -5$

(C) $a > 5$ (D) $2 < a < 5$

36. The value of $\frac{\tan 15^o}{2 - \sec^2 15^o}$ is equal to

(A) $\frac{1}{2\sqrt{3}}$ (B) $\frac{\sqrt{3}}{2}$

(C) $-\frac{1}{2\sqrt{3}}$ (D) $\frac{1}{8\sqrt{3}}$

37. The solutions of the equation $4\cos^2 x + 6\sin^2 x = 5$ are

(A) $x = n\pi \pm \frac{\pi}{4}$ (B) $x = n\pi \pm \frac{\pi}{3}$

(C) $x = n\pi \pm \frac{\pi}{2}$ (D) $x = n\pi \pm \frac{2\pi}{3}$

38. The sum of coefficients of integral powers of x in the binomial expansion of $\left(1 - 2\sqrt{x}\right)^{50}$ is :

(A) $\frac{1}{2}\left(3^{50} - 1\right)$ (B) $\frac{1}{2}\left(2^{50} + 1\right)$

(C) $\frac{1}{2}\left(3^{50}+1\right)$ (D) $\frac{1}{2}\left(3^{50}\right)$

39. Which of the following statements is true?
(A) $\{3, 5\} \in \{1, 3, 5\}$ (B) $\{3\} \in \{1, 3, 5\}$
(C) $3 \in \{1, 3, 5\}$ (D) $3 \subseteq \{1, 3, 5\}$

40. A value of θ for which $\frac{2+3i\sin\theta}{1-2i\sin\theta}$ is purely imaginary, is :
(A) $\frac{\pi}{6}$ (B) $\sin^{-1}\left(\frac{\sqrt{3}}{4}\right)$
(C) $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$ (D) $\frac{\pi}{3}$

INTEGER

ANSWER TYPE [0 : For incorrect Ans.]
MARKING SCHEME : [+6 : For correct Ans.]

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41. The smallest positive integer k satisfying the inequality $\frac{x-5}{x^2+5x-14} > 0$ is

42. If 100 times the 100^{th} term of an AP with non-zero common difference equals the 50 times its 50^{th} term, then the 150^{th} term of this AP is

43. The least value of n for which $1 + 2 + 2^2 + \ldots n$ terms is greater than 100 is

44. If the term independent of x in the expansion of $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^9$ is k, then 18 k is equal to :

45. The least positive integer n for which $\left(\frac{1+i\sqrt{3}}{1-i\sqrt{3}}\right)^n = 1$, is :

Answer Key

1. C
2. C
3. C
4. C
5. A
6. A
7. C
8. C
9. C
10. C
11. 8
12. 6
13. 0
14. 5
15. 8
16. C
17. A
18. C
19. A
20. C
21. C
22. D
23. D
24. D
25. B
26. 6
27. 3
28. 9
29. 1
30. 8
31. C
32. D
33. D

34. A
35. A
36. A
37. A
38. C
39. C
40. C
41. 1
42. 0
43. 7
44. 7
45. 3