AUROUS ACADEMY
IIT-JEE | NEET | FOUNDATION

PATTERN : JEE MAINS
Batch : Class XI
MINOR TEST 3 | Date : 26.05.2024
READ THE INSTRUCTIONS CAREFULLY

Time Allotted: 3 Hours Maximum Marks: 300

- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
- You are not allowed to leave the Examination Hall before the end of the test.

Important Instructions

Caution: Question Paper CODE as given above MUST be correctly marked in the answer OMR sheet before attempting the paper. Wrong CODE or no CODE will give wrong results.

A. General Instructions

1. Attempt ALL the questions. Answers have to be marked on the OMR sheets.
2. This question paper contains **75 QUESTIONS.**
3. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
4. No candidate is allowed to carry any textual material, printed or written, bits of papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices ext. except the Admit Card inside the examination hall / room.

B. Filling of OMR Sheet:

1. Ensure matching of OMR sheet with the Question paper before you start marking your answers on OMR sheet.
2. On the OMR sheet, darken the appropriate bubble with ***Blue/Black Ball Point Pen*** for each character of your Enrolment No. and write in ink your Name, Test Centre and other details at the designated places.
3. OMR sheet contains alphabets, numerals & special characters for marking answers.
4. **Do not fold or make any stray marks on the Answer Sheet.**

C. Marking Scheme for All Two Parts:

(i) Que No.(01-20, 26-45, 51-70) – Contains Sixty (60) multiple choice objective questions which have four(4) options each and only one correct option. Each question carries **+4 marks** for every correct answer and **-1 mark** will be deducted for every incorrect answer.

(ii) Que No.(21-25, 46-50, 71-75) contains Fifteen (15) Numerical based questions **(NO DECIMAL VALUE)**. Each question carries **+4 marks** will be awarded for every correct answer, **–1 for wrong answer** and **0 mark** for all other cases.

Name of the Candidate :_____

Batch :_____ **Date of Examination :**_____

PHYSICS

SINGLE OPTION CORRECT TYPE

1. Velocity of a body moving along a straight line with uniform acceleration (a) reduces by $\frac{3}{4}$ of its initial velocity in time t_0. The total time of motion of the body till its velocity becomes zero is

(A) $\frac{4}{3}t_0$ (B) $\frac{3}{2}t_0$ (C) $\frac{5}{3}t_0$ (D) $\frac{8}{3}t_0$

2. The velocity of a particle moving in the positive direction of X – axis varies as $v = 5\sqrt{x}$. Assuming that at $t = 0$, particle was at $x = 0$. What is the acceleration of the particle?

(A) 12.5 ms^{-2} (B) 7.5 ms^{-2} (C) 5 ms^{-2} (D) 2.5 ms^{-2}

3. A stone is thrown up with a velocity of 9.8 ms^{-1}, then how much time will it take to come back?

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

4. A stone thrown upward with a speed u from the top of the tower reaches the ground with a speed 3u. The height of the tower is

(A) $3u^2/g$ (B) $4u^2/g$ (C) $6u^2/g$ (D) $9u^2/g$

5. A particle is dropped under gravity from rest from a height h (g = 9.8 ms^{-2}) and it travels a distance 9h/25 in the last second, the height h is

(A) 100 m (B) 122.5 m (C) 145 m (D) 167.5 m

6. A body falls from a height h = 200 m. The ratio of distance travelled in each 2s, during t = 0 to = 6s of the journey is

(A) 1 : 4 : 9 (B) 1 : 2 : 4 (C) 1 : 3 : 5 (D) 1 : 2 : 3

7. The displacement of a particle moving in a straight line depends on the time as $x = \alpha t^3 + \beta t^2 + \gamma t + \delta$.

The ratio of initial acceleration to its initial velocity depends

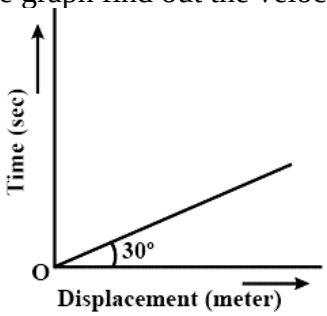
(A) only on α and γ (B) only on β and γ (C) only on α and β (D) only on α

8. The acceleration of a particle is increasing linearly with time t as bt. The particle starts from the origin with an initial velocity v_0. The distance travelled by the particle in time t will be

ROUGH SPACE

(A) $v_0 t + \frac{1}{6} bt^3$ (B) $v_0 t + \frac{1}{3} bt^3$ (C) $v_0 t + \frac{1}{3} bt^2$ (D) $v_0 t + \frac{1}{2} bt^2$

9. From the displacement – time graph find out the velocity of a moving body.

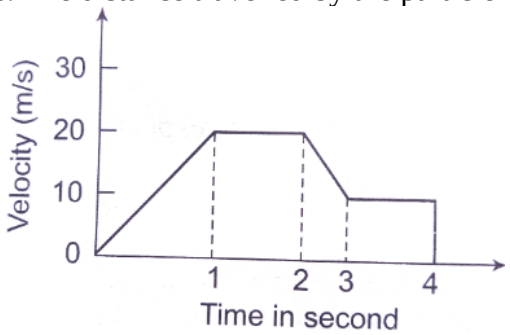


(A) $\frac{1}{\sqrt{3}} ms^{-1}$ (B) $3\ ms^{-1}$ (C) $\sqrt{3} ms^{-1}$ (D) $\frac{1}{3} ms^{-1}$

10. The graph between displacement and time for a particle moving with uniform acceleration is a

(A) straight line with a positive slope (B) parabola
(C) ellipse (D) straight line parallel to time axis

11. The variation of velocity of a particle with time moving along a straight line is illustrated in the adjoining figure. The distance travelled by the particle in 4s is



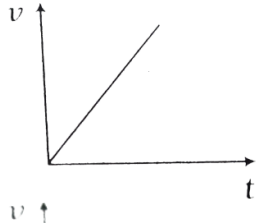
(A) 60 m (B) 55 m (C) 25 m (D) 30 m

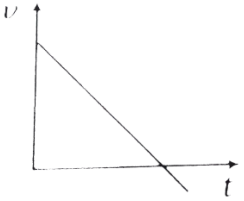
12. The $x - t$ equation is given as $x = 2t + 1$. The corresponding v – t graph is

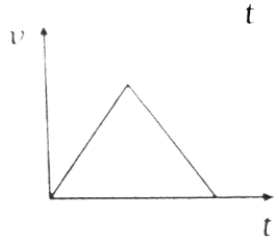
(A) a straight line passing through origin (B) a straight line not passing through origin
(C) a parabola (D) none of the above

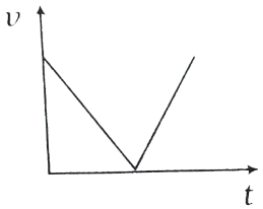
ROUGH SPACE

13. Which of the following graphs correctly represents velocity – time relationship for a particle released from rest to fall freely under gravity?

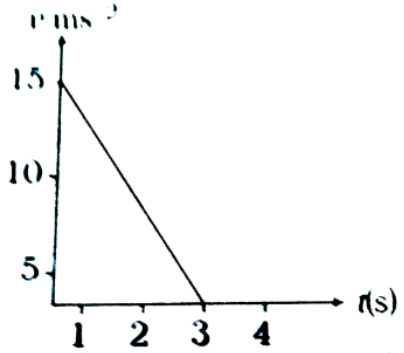
(A) 

(B) 

(C) 

(D) 

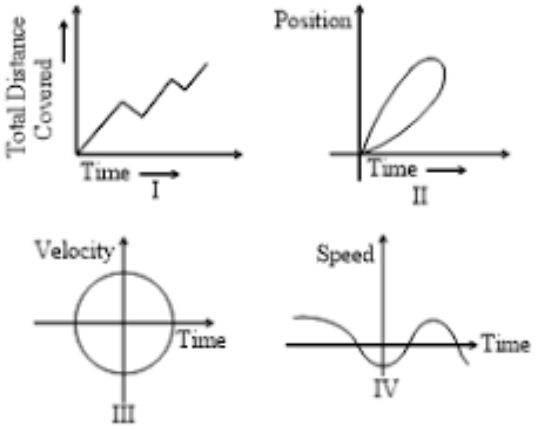
14. The velocity – time graph is shown in the figure, for a particle. The acceleration of particle is



(A) 22.5 ms^{-2} (B) 5 ms^{-2} (C) –5 ms^{-2} (D) –3 ms^{-2}

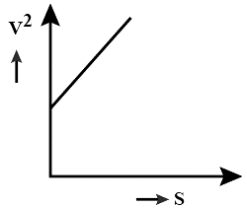
15. Which of the following graphs cannot possibly represent one dimensional motion of a particle.

ROUGH SPACE



(A) I and II (B) II and III (C) II and IV (D) All four

16. v^2 versus s – graph of a particle moving in a straight line is shown in the figure. From the graph some conclusions are drawn. State which statement is wrong?



(A) The given graph shows a uniformly accelerated motion
(B) Initial velocity of particle is zero
(C) Corresponding s – t graph will be a parabola
(D) None of the above

17. The area under acceleration time graph gives
(A) distance travelled (B) change in acceleration
(C) force acting (D) change in velocity

18. The velocity of a body depends on time according to the equation $v = \frac{t^2}{10} + 20$. The body is undergoing
(A) Uniform acceleration (B) Uniform retardation
(C) Non – uniform acceleration (D) Zero acceleration

ROUGH SPACE

19. A ball thrown vertically upwards after reaching a maximum height h returns to the starting point after a time of 10 s. Its displacement after 5 s is
(A) h (B) 2h (C) 10 h (D) 20 h

20. The acceleration of a moving body is found from the
(A) area under velocity – time graph
(B) area under displacement – time graph
(C) slope of distance – time graph
(D) slope of velocity – time graph

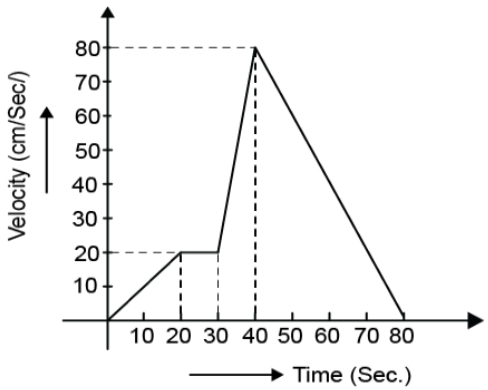
INTEGER TYPE

21. A particle starts with a velocity of 2 ms^{-1} and moves in a straight line with a retardation of 0.1 ms^{-2}. Find first time (in sec) at which the particle is 15 m from the starting point.

22. A person throws balls into air after every second. The next ball is thrown when the velocity of the first ball is zero. How high (in metre) do the ball rise above his hand?

23. A particle is moving such that $s = t^3 - 6t^2 + 18t + 9$, where s is in metres and t is in seconds. Find minimum velocity attained by the particle is

24. The v – t graph of a moving object is shown in the figure. Find maximum acceleration (in ms^{-2}).



25. The motion of a particle along a straight line is described by equation $x = 8 + 12t - t^3$ where, x is in metre and t in second. Find retardation (in ms^2) of the particle when its velocity becomes zero.

ROUGH SPACE

CHEMISTRY

(*Instructions: For STP and NTP take 1 bar pressure and 273 K temperature*)

SINGLE OPTION CORRECT TYPE

26. Which of the following pairs of substances illustrate the law of multiple proportions
(A) CO and CO_2 (B) H_2O and D_2O (C) $NaCl$ and $NaBr$ (D) MgO and $Mg(OH)_2$

27. The percentage of copper and oxygen in samples of CuO obtained by different methods were found to be the same. This illustrates the law of
(A) Constant proportions (B) Conservation of mass
(C) Multiple proportions (D) Reciprocal proportions

28. Avogadro number is
(A) Number of atoms in one gram of element
(B) Number of millilitres which one mole of a gaseous substances occupies at NTP
(C) Number of molecules present in one gram molecular mass of a substance
(D) All of these

29. 1 mol of CH_4 contains
(A) 6.02×10^{23} atoms of H (B) 4 g atom of Hydrogen
(C) 1.81×10^{23} molecules of CH_4 (D) 3.0 g of carbon

30. Number of molecules in 100 ml of each of O_2, NH_3 and CO_2 at STP are
(A) In the order $CO_2 < O_2 < NH_3$ (B) In the order $NH_3 < O_2 < CO_2$
(C) The same (D) $NH_3 = CO_2 < O_2$

31. 1.24 gm P is present in 2.2 gm
(A) P_4S_3 (B) P_2S_2 (C) PS_2 (D) P_2S_4

32. If N_A is Avogadro's number then number of valence electrons in 4.2 g of nitride ions (N^{3-})
(A) 2.4 N_A (B) 4.2 N_A (C) $1.6N_A$ (D) $3.2N_A$

33. For the reaction 2P + Q $\rightarrow$ R, 10 mol of P and 6 mol of Q will produce
(A) 8 mol of R (B) 5 mol of R (C) 4 mol of R (D) 13 mol of R

ROUGH SPACE

34. The number of molecules at NTP in 1 *ml* of an ideal gas will be
(A) 6×10^{23} (B) 2.65×10^{19} (C) 2.65×10^{23} (D) 2.65×10^{21}

35. The number of molecules in 4.25 *g* of ammonia are
(A) 0.5×10^{23} (B) 1.5×10^{23} (C) 3.5×10^{23} (D) 1.8×10^{32}

36. Which one of the following pairs of gases contains the same number of molecules
(A) 16 *g* of O_2 and 14 *g* of N_2 (B) 8 *g* of O_2 and 22 *g* of CO_2
(C) 28 *g* of N_2 and 22 *g* of CO_2 (D) 32 *g* of O_2 and 32 *g* of N_2

37. The total number of protons in 10 *g* of calcium carbonate is ($N_0 = 6.023\times10^{23}$)
(A) 1.5057×10^{24} (B) 2.0478×10^{24} (C) 3.0115×10^{24} (D) 4.0956×10^{24}

38. The numbers of moles of $BaCO_3$ which contain 1.5 moles of oxygen atoms is
(A) 0.5 (B) 1 (C) 3 (D) 6.02×10^{23}

39. 14 litre of H_2 and 11.2 litre of Cl_2 are mixed and exploded. The composition by volume of mixture is-
(A) 14 litre of HCl (B) 2.8 litre Cl_2 and 20.8 lit HCl
(C) 2.8 litre H_2 & 22.4 litre HCl (D) 22.4 litre HCl

40. How many mole of $Zn(FeS_2)$ can be made from 3 mole zinc, 3 mole iron and 7 mole sulphur
(A) 7 mole (B) 3 mole (C) 4 mole (D) 6 mole

41. The largest number of molecules is in
(A) 34*g* of water (B) 28*g* of CO_2 (C) 46*g* of CH_3OH (D) 54*g* of N_2O_5

42. 2g of oxygen contains number of atoms equal to that in
(A) 0.5*g* of hydrogen (B) 4*g* of sulphur
(C) 7*g* of nitrogen (D) 2.3*g* of sodium

43. The simplest formula of a compound containing 50% of element X (atomic mass 10) and 50% of element *Y* (atomic mass 20) is
(A) XY (B) X_2Y (C) XY_3 (D) X_2Y_3

ROUGH SPACE

44. The empirical formula of an acid is CH_2O_2, the probable molecular formula of acid may be

(A) CH_2O (B) CHO_2 (C) $C_2H_4O_4$ (D) $C_3H_6O_4$

45. In which of the following pairs of compounds the ratio of *C, H* and *O* is same

(A) CH_3COOH and CH_3OH (B) $C_6H_{12}O_6$ and CH_3COOH

(C) CH_3COCH_3 and CH_3COOH (D) All of these

NUMERICAL TYPE (NO DECIMAL VALUE)

46. The number of moles of sodium atoms in 2 moles of Na_2SO_4 is

47. The mass percentage of oxygen in 1 mol of NaOH is

48. 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What will be the percentage purity of magnesium carbonate in the sample? (Atomic weight of Mg = 24)

49. What weight of SO_2 can be made by burning excess of sulphur in 5.0 moles of oxygen

50. 56 g of N_2 are reacted with 12 gm of H_2 according to the following reaction calculate the number of moles of NH_3.

$$N_2 + 3H_2 \rightarrow 2NH_3$$

MATHEMATICS

SINGLE OPTION CORRECT TYPE

51. The expression $\log_p \log_p \underbrace{\sqrt[p]{\sqrt[p]{\sqrt[p]{.....\sqrt[p]{p}}}}}_{\text{n radical sign}}$

where $p \geq 2$, $p \in N$; $n \in N$ when simplified is.

(A) independent of p (B) independent of p and of n

(C) depend on both p & n (D) positive

52. The value of $a^{\frac{\log_b \log_b N}{\log_b a}}$ is-

(A) $\log_b N$ (B) $-\log_b N$ (C) $\log_N b$ (D) $-\log_N b$

ROUGH SPACE

53. If $\left(a^{\log_b x}\right)^2 - 5\ x^{\log_b a} + 6 = 0$ where a > 0, b > 0 & ab ≠ 1. Then the value of x is equal to

(A) $2^{\log_b a}$ (B) $3^{\log_a b}$ (C) $2^{\log_a 2}$ (D) $a^{\log_b 3}$

54. If $\log_{16} x = \frac{3}{4}$ and $\log_y 0.125 = -3$, then the value of $\log_{0.25}\left(\frac{x}{y}\right)$ is-

(A) 1 (B) –1 (C) 2 (D) 4

55. $x^{\log_5 x} > 5$ implies

(A) $x \in (0, \infty)$ (B) $x \in (0, 1/5) \cup (5, \infty)$

(C) $x \in (1, \infty)$ (D) $x \in (1, 2)$

56. $\log_2\left[\log_4\left(\log_{10} 16^4 + \log_{10} 25^8\right)\right]$ simplifies to

(A) an irrational (B) an odd prime

(C) a composite (D) Unity

57. $\log_2 7$ is

(A) an integer (B) a rational number

(C) an irrational number (D) a prime number

58. If $3\log_2 x + \log_2 27 = 3$ then the value of x is

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

59. Which of the following numbers are positive?

(A) $\log_{\log_3^2}\left(\frac{1}{2}\right)$ (B) $\log_{10}\sin 125^\circ$

(C) $\log_{10}\log_{10} 9$ (D) None of these

60. Consider a triangle with sides 3,4,6 cm respectively as an ant runs around a triangle in such a way that it maintains a distance of one centimetre from the sides of triangle, then total distance travelled by it is

(A) 13 (B) 13 + π (C) 13 + 2π (D) 13 + 3π

ROUGH SPACE

61. Sec $\left(2024\pi+\frac{3\pi}{4}\right)$ is

(A) $\sqrt{2}$ (B) $\frac{1}{\sqrt{2}}$ (C) $-\frac{1}{\sqrt{2}}$ (D) None of these

62. If $\sin x + \sin^2 x = 1$ then $\cos^8 x + 2\cos^6 x + \cos^4 x =$

(A) 0 (B) 1 (C) 4 (D) 3

63. $\sin(-420^\circ) \times \cos 390^\circ + \cos(-660^\circ) \times \sin 330^\circ =$

(A) 1 (B) –1 (C) $\frac{1}{2}$ (D) $-\frac{1}{2}$

64. $\sin 6^C$ is

(A) > 0 (B) < 0 (C) = 0 (D) None

65. Which of the following is correct?

(A) $\tan 1 > \tan 1^\circ$ (B) $\tan 1 < \tan 1^\circ$ (C) $\sin 1 < \sin 1^\circ$ (D) $\cos 1 > \cos 1^\circ$

66. If $81^{(1/\log_5 3)} + 27^{\log_9 36} + 3^{4/\log_7 9} = n$, then sum of digits of n is

(A) even (B) divisible by 3 (C) a multiple of 6 (D) prime

67. If $\log_y x + \log_x y = 2$, $x^2 + y = 12$, then the values of x, y are

(A) 3, 3 (B) 3, 4 (C) 4, 8 (D) 1, 11

68. If $a = \log_{1/2}\sqrt{0.125}$ and $b = \log_3\left(\frac{1}{\sqrt{24}-\sqrt{17}}\right)$ then

(A) a> 0, b > 0 (B) a < 0, b > 0 (C) a > 0, b < 0 (D) a < 0, b > 0

69. If $a^4 \cdot b^5 = 1$ then the value of $\log_a(a^5 b^4)$ equals

(A) 9/5 (B) 4 (C) 5 (D) 8/5

70. If $2 < |x - 5| \leq 7$ then number of positive integral values of x are

(A) 5 (B) 7 (C) 9 (D) 11

ROUGH SPACE

NUMERICAL TYPE (NO DECIMAL VALUE)

71. $N = \dfrac{81^{\frac{1}{\log_5 9}} + 3^{\frac{3}{\log_{\sqrt{6}} 3}}}{409}\left(\left(\sqrt{7}\right)^{\frac{2}{\log_{25} 7}} - 125^{\log_{25} 6}\right)$

Then $\log_2 N$ has the value-

72. Number of integral values of x satisfying the inequality $\left(\frac{3}{4}\right)^{6x+10-x^2} < \frac{27}{64}$ is

73. The number of integer values which does not satisfy $\log_3 |3 - 4x| > 2$

74. The difference between roots of the equation $3\sqrt{\log_2 x} - \log_2 8x + 1 = 0$

75. Find the number of solution of the equation.
$5|x + 3| + 7|x - 7| = 5$

❐❐❐

ROUGH SPACE