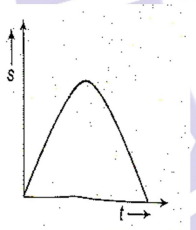
NEW STANDARD ACADEMY

Marks: 150

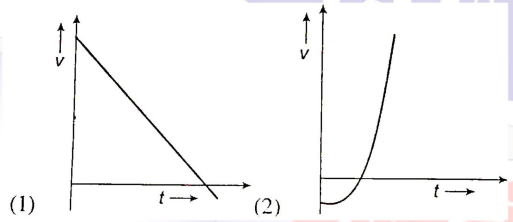
Date : 26-05-25 **CLASS : 11TH JEE** **Time: $2\frac{1}{2}$ hours**

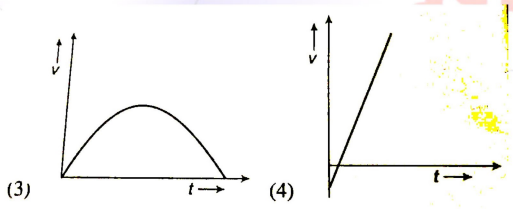
PHYSICS

1. A ball is released from the top of a tower of height h meters. It takes T seconds to reach the ground. What is the position of the ball in T/3 seconds
   (a) h/9 meters from the ground
   (b) 7h/9 meters from the ground
   (c) 8h/9 meters from the ground
   (d) 17h/18 meters from the ground
2. A particle is dropped vertically from rest from a height. The time taken by it to fall through successive distances of 1m each will then be
   (a) All equal, being equal to $\sqrt{2}/g$ second
   (b) In the ratio of the square roots of the integers 1, 2, 3…..
   (c) In the ratio of the difference in the square roots of the integers ie $\sqrt{1}.(\sqrt{2}-\sqrt{1}),(\sqrt{3}-\sqrt{2}),(\sqrt{4}-\sqrt{3})$
   (d) In the ratio of the reciprocal of the square roots of the integers i.e..$\frac{1}{\sqrt{1}},\frac{1}{\sqrt{2}},\frac{1}{\sqrt{3}},\frac{1}{\sqrt{4}}$
3. The graph of displacement vs.time is

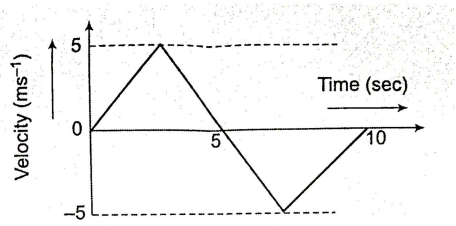


Its corresponding velocity – time graph will be



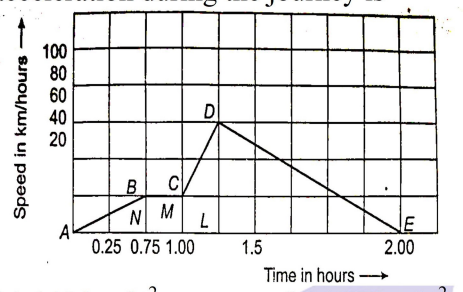


4. The *u-t* plot of moving object is shown in the figure . The average velocity of the object during the first 10 second is



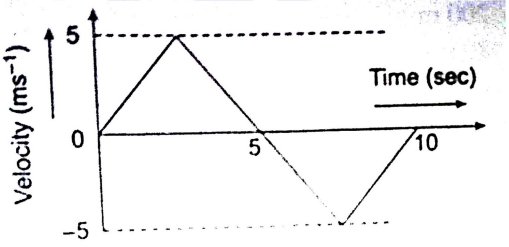
   (a) 0 (b)2.5ms^{-1}
   (c) 5ms^{-1} (d) 2ms^{-}
5. A body move from rest with a constant acceleration of 5m/s^2. Its instantaneous speed (in m/s) at the end of 10 sec is
   (a) 50 (b) 5
   (c) 2 (d) 0.5
6. The motion of a particle is described by the equation x=a +bt^2 where a = 15 cm and b=3 cm/s^2.Its instantaneous velocity at time 3 sec will be
   (a) 36cm/sec (b) 18 cm/sec
   (c) 16 cm/sec (d) 32 cm/sec
7. A particle is dropped under gravity from rest from a height h(g =9.8m/sec^2) and it travels a distance 9h/25 in the last second the height h is
   (a) 100 m (b) 122.5 m
   (c) 145m (d) 167.5 m
8. An aeroplane is moving with horizontal velocity *u* at height *h*. The velocity of a packet dropped from it on the earth's surface will be (g is acceleration due to gravity)
   (a) $\sqrt{u^2+2gh}$ (b) $\sqrt{2gh}$
   (c) 2gh (d) $\sqrt{u^2-2gh}$
9. A stone is thrown with an initial speed of 4.9m/s from a bridge in vertically upward direction. It falls down in water after 2 sec. The height of the bridge is
   (a) 4.9 m (b) 9.8 m
   (c) 19.8 m (d) 24.7 m
10. A train moves from one station to another in 2 hours time. Its speed-time graph during this

motion is shown in the figure. The maximum acceleration during the journey is



(a) 140 km h^{-2} (b) 160 km h^{-2}
(c) 100 km h^{-2} (d) 120 km h^{-2}

11. The *v-t* plot of a moving object is shown in the figure. The average velocity of the object during the first 10 seconds



(a) 0 (b) 2.5 ms^{-1}
(c) 5 ms^{-1} (d) 2 ms^{-1}

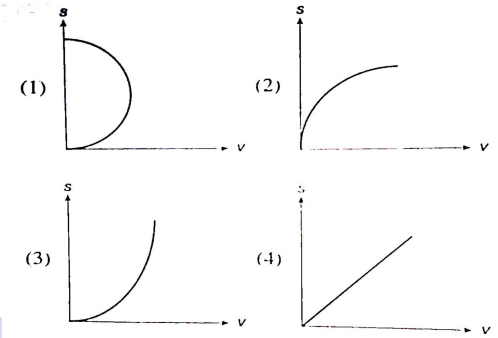
12. A particle moves along x-axis is $x = 4(t - 2) + a(t - 2)^2$
Which of the following is true?
(a) The initial velocity of particle is 4
(b) The acceleration of particle is 2a
(c) The particle is at origin at t = 0
(d) None of these

13. A cricket ball is thrown up with a speed of 19.6m s^{-1} The maximum height it can reach is
(a) 9.8 m (b) 19.6 m
(c) 29.4 m (d) 39.2 m

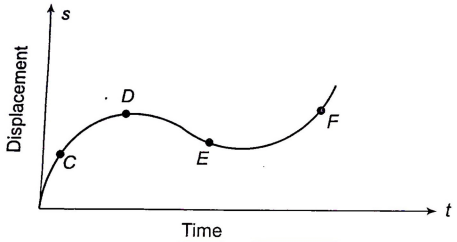
14. A body falls from a height h = 200m (at New Delhi). The ratio of distance travelled in each 2 sec during t = 0 to t = 6 second of the journey is
(a) 1:4:9 (b) 1:2:4
(c) 1:3:5 (d) 1:2:3

15. A ball is released from the top of a tower of height *h* meters. It takes T seconds to reach the ground. What is the position of the ball in T/3 seconds
(a) h/9 meters from the ground
(b) 7h/9 meters from the ground
(c) 8h/9 meters from the ground
(d) 17h/18 meters from the ground

16. An object is moving with a uniform acceleration which is parallel to its instantaneous direction of motion. The displacement (s)-velocity (v) graph of this object is

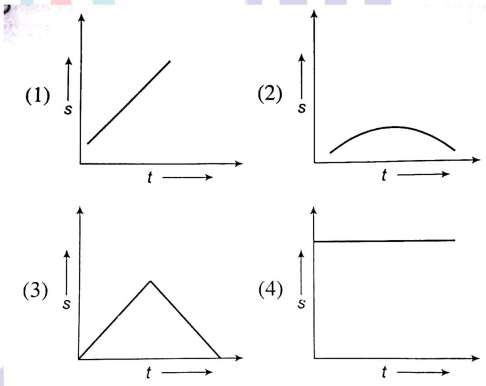


17. The displacement-time graph of moving particle is shown below



The instantaneous velocity of the particle is negative at the point
(a) D (b) F
(c) C (d) E

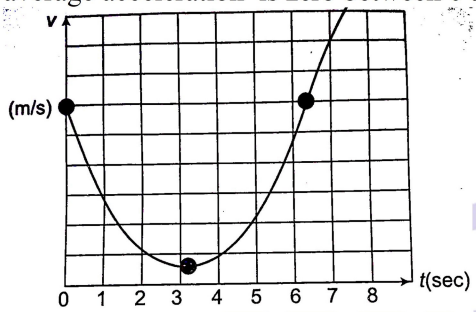
18. Which of the following graph represents uniform motion?



19. A point starts moving in a straight line with a certain acceleration. At a time t after beginning of motion the acceleration suddenly becomes retardation of the same value. The time in which the point returns to the initial point is
(a) $\sqrt{2t}$ (b) $(2+\sqrt{2})$ t
(c) $\frac{t}{\sqrt{2}}$
(d) Cannot be predicted unless acceleration is given

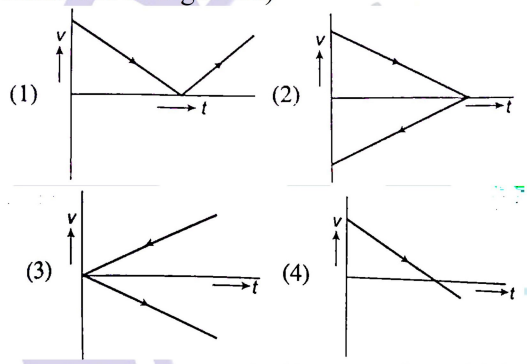
20. A stone is dropped from a height h. Simultaneously, another stone is thrown up from the ground which reaches a height 4h. The two stones cross each other after time
(a) $\sqrt{\frac{h}{8g}}$ (b) $\sqrt{8gh}$
(c) $\sqrt{2gh}$ (d $\sqrt{\frac{h}{2g}}$

21. Velocity-time graph for a particle is shown in figure Starting from t = 0 at what instant t, average acceleration is zero between 0 and t?

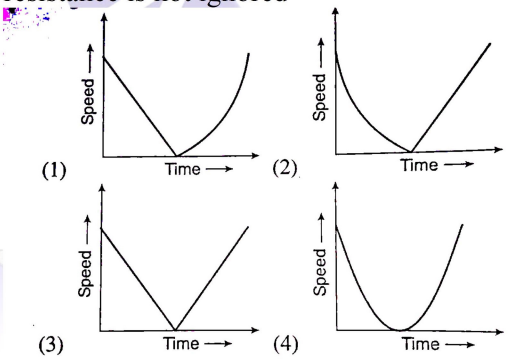


(a) 1s (b) 3.5 s
(c) 6.3 s (d) 7.3 s

22. A ball is thrown vertically upwards. Which of the following graph/graphs represent velocity-time graph of the ball during its flight (air resistance is neglected)



23. A ball is thrown vertically upwards. Which of the following plots represents the speed-time graph of the ball during its height if the air resistance is not ignored



24. If a ball is thrown vertically upwards with speed u, the distance covered during the last t seconds of its ascent is
(a) $1/2\ gt^2$ (b) $ut - 1/2\ gt^2$
(c) $(u - gt)t$ (d) ut

25. A body is slipping from an inclined plane of height h and length *l*. If the angle of inclination is θ the time taken by the body to come from the top to the bottom of this inclined plane is
(a) $\sqrt{\frac{2h}{g}}$ (b) $\sqrt{\frac{2l}{g}}$
(c) $1/\sin\theta \sqrt{\frac{2h}{g}}$ (d) $\sin\theta \sqrt{\frac{2h}{g}}$

CHEMISTRY

26. The discovery of neutron came very late because
(a) Neutrons are present in nucleus
(b) Neutrons are highly unstable particles
(c) Neutrons are chargeless
(d) Neutrons do not move

27. The total number of neutrons in dipositive zinc ions with mass number 70 is.
(a) 34 (b) 40
(c) 36 (d) 38

28. The number of unpaired electrons in the Fe^{2+} ion is
(a) 0 (b) 4
(c) 6 (d) 3

29. An element has the electronic configuration $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^2$ Its valence electrons are
(a) 6 (b) 2
(c) 3 (d) 4

30. Pick out the isoelectronic structures from the following.

CH_3^+	H_3O^+	NH_3	CH_3^-
I	II	III	IV

(a) I and II (b) I and IV
(c) I and III (d) II, III and IV

31. The numbers of electrons and neutrons of an element are 18 and 20 respectively. Its mass number is
(a) 17 (b) 37
(c) 2 (d) 38

32. Rutherford's scattering experiment is related to the size of the
(a) Nucleus (b) Atom
(c) Electron (d) Neutron

33. When beryllium is bombarded with a-particles, extremely penetrating radiations which cannot be deflected by electrical or magnetic field are given out. These are
(a) A beam of protons (b) α-rays
(c) A beam of neutrons (d) X-rays

34. An isotone of $_{32}Ge^{76}$ is
(i) $_{32}Ge^{77}$ (ii) $_{53}As^{77}$
(iii) $_{34}Se^{77}$ (iv) $_{34}Se^{78}$
(a) Only (1) and (ii)
(b) Only (ii) and (ii)
(c) Only (ii) and (iv)
(d) (ii), (iii) and (iv)

35. Nitrogen atom has an atomic number of 7 and oxygen has an atomic number 8. The total number of electrons in a nitrate ion will be
(a) 8 (b) 16
(c) 32 (d) 64

36. When atoms are bombarded with alpha particles, only a few in million suffer deflection, others pass out undeflected. This is because
(a) The force of repulsion on the moving alpha particle is small
(b) The force of attraction on the alpha particle to the oppositely charged electrons is very small.
(c) There is only one nucleus and large number of electrons.
(d) The nucleus occupies much smaller volume compared to the volume of the atom.

37. Rutherford's experiment, which established the nuclear model of the atom, used a beam of:
(a) β-particles which impinged on a metal foil and got absorbed.
(b) γ-rays which impinged on a metal foil and ejected electrons.
(c) helium atoms, which impinged on a metal foil and got scattered.
(d) helium nuclei, which impinged on a metal foil and got scattered.

38. The electronic configuration of a dipositive ion M^{2+} is 2, 8, 14 and its mass number is 56. The number of neutrons present is
(a) 32 (b) 42
(c) 30 (d) 34

39. A sodium cation has different number of electrons from
(a) O^{2-} (b) F^-
(c) Li^+ (4) Al^{+3}

40. In what ratio should $_{17}Cl^{37}$ and $_{17}Cl^{35}$ be present so as to obtain $_{17}Cl^{35.5}$?
(a) 1:2 (b) 1:1
(c) 1:3 (d) 3:1

41. The isoelectronic pair is
(a) Cl_2O, ICl_2 (b) Cl_2^- ,ClO_2
(c) IF_2^+, I_3^- (d) ClO_2^-, ClF_2^+

42. A wavelength of 400 nm corresponds to
(a) frequency (ν) = 7.5×10^{14} Hz
(b) wave number ($\bar{\nu}$)= 2.5×10^{6} m^{-1}
(c) momentum (mv) = 1.66×10^{-27} kg ms^{-1}
(d) All of the above

43. The energy of a photon is calculated by
(a) $E = h\nu$ (b) $h = E\nu$
(c) $h = E/\nu$ (d) $E = h/\nu$

44. Select the incorrect statement(s).
(a) Electromagnetic radiation is a form of energy consisting of oscillating electric field only.
(b) Visible light is a form of electromagnetic radiation.
(c) The electromagnetic spectrum of sunlight received at the Earth's surface differs from that emitted by the Sun.
(d) Cathode rays travel from anode (source) to cathode.

45. Given.
(I) Radiations for microwave oven
(II) Amber light from traffic signals
(III) Radiations from FM radio
(IV) Cosmic rays from outer space
(V) X-rays
Increasing order of their energies is
(a) I < II < III < IV < V
(b) V < IV < III < II< I
(c) I < III < V < IV < II
(d) III < I < II < V < IV

46. The longest wavelength of light capable of breaking a single (Cl - Cl) bond in Cl_2 is [Given, Cl-Cl(g) → 2Cl(g); ΔH = 242kJ Mol^{-1}]
(a) 494 pm (2) 494 nm
(c) 494 Å (d) 247 nm

47. The work function of a metal is 4.2 eV If radiations of 2000Å fall on the metal, then the kinetic energy of the fastest photoelectron is
(a) 1.6×10^{-19} J (2) 16×10^{-10} J
(c) 3.2×10^{-19} J (4) 6.4×10^{-10} J

48. Light of wavelength 5000 Å falls on a metal surface of work function 1.9 eV.
The kinetic energy of photoelectrons is
(a) 9.3×10^{-20} J (b) 7.2×10^{-14} J
(c) 6.8×10^{-14} J (d) 2.5×10^{-13} J

49. The velocity of electron ejected from a platinum surface when radiation of 200 nm falls on it. The work function of platinum is 5 eV (1eV = 1.6×10^{-19} J)
(a) 7×10^{6} m s^{-1} (b) 3.8×10^{5} m s^{-1}
(c) 2.6×10^{5} ms^{-1} (4) 6.54×10^{5} m s^{-1}

50. The ratio of slopes of maximum K.E. vs. v and V_0 vs v in the photoelectric effect gives
(a) Planck's constant
(b) Charge on electron
(c) Work function
(d) Ratio of $\frac{h}{e}$

MATH

51. Find the domain of the function *f given by f(x)* = $\frac{1}{\sqrt{[x]^2-[x]-6}}$.
(a) $(-\infty,-2) \cup [4,\infty)$
(b) $(-\infty,2) \cup [8,\infty)$
(c) $(-\infty,2) \cup [4,\infty)$
(d) $(-\infty,-2) \cup [8,\infty)$

52. The domain of the function f(x) = $\frac{1}{\sqrt{x-[x]}}$, where [.] denotes the greatest intger function is

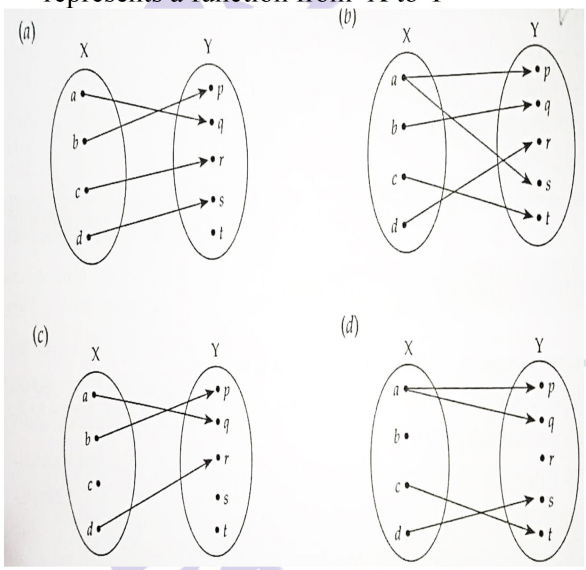
(a) R (b) R^+
(c) R^- (d) R-Z

53. Given R = {(x, y) : x, y ∈ Z, y = x – 3}, then which ordered pair belongs to R?
(a) (1,4) (b) (0,3)
(c) (5,2) (d) (-4, 1)

54. If A ={ a,b } and B = {x, y, z}, then the number of relations from B to A is
(a) 8 (b) 16
(c) 32 (d) 64

55. Let n(A) = m and n(B) = n, then the number of non-empty relations from A to B is
(a) m^n (b) $n^m - 1$
(c) $2^{mn} - 1$ (d) 2^{mn}

56. Which of the following arrow diagrams represents a function from X to Y



57. Let A be a finite set containing 3 elements, then the number of functions from A to A is
(a) 512 (b) 511
(c) 27 (d)26

58. The domain of of the function *f* defined by $f(x) = (x^2 + 2x + 1)/(x^2 - x - 6)$ is
(a) R-[3,-2] (b) R – {- 3, 2}
(c) R – {3, - 2) (d) R - (- 3, 2)

59. The domain and range of the real function f defined by $f(x) = \frac{1}{4x^2-1}$ are
(a) Domain = $\left\{-\frac{1}{2}, \frac{1}{2}\right\}, Range = (-\infty, -1] \cup (0, \infty)$
(b) Domain = R- $\left\{-\frac{1}{2}, \frac{1}{2}\right\}, Range = (-\infty, -1] \cup (0, \infty)$
(c) Domain = $\left[-\frac{1}{2}, \frac{1}{2}\right], Range = (-\infty, 0] \cup (0, \infty)$
(d) Domain = $R - \left\{-\frac{1}{2}, \frac{1}{2}\right\}, Range = (-\infty, 1] \cup (2, \infty)$

60. The domain and range of the real function f defined by $f(x) = \sqrt{x-1}$ *are*
(a) Domain = (1,∞), $Range = (0, \infty)$
(b) Domain = [1,∞), $Range = (0, \infty)$
(c) Domain = [1,∞), $Range = [0, \infty)$
(d) Domain = (1,∞) , $Range = [0, \infty)$

61. The domain and range of the real function f defined by $\frac{x}{|x|}$ are
(a) Domain =R , Range = {-1,1}
(b) Domain =R –{0} , Range = {-1,0,1}
(c) Domain =R-{0} , Range = {-1,1}
(d) Domain =R , Range = {-1,0,1}

62. The domain of the function *f* defined by $f(x) = \sqrt{a-x} + \frac{1}{\sqrt{x^2-a^2}}$ *is*
(a) $(-\infty, a]$ (b) $(-\infty, -a]$
(c) $(-\infty, -a)$ (d) (a,∞)

63. The domain of the function *f defined by f(x) = $\log_e$(5-6x) is*
(a) $\left(-\infty, \frac{5}{6}\right)$ (b) $\left(\frac{5}{6}, \infty\right)$
(c) $\left(-\infty, \frac{5}{6}\right]$ (d) $\left[\frac{5}{6}, \infty\right)$

64. If $[x]^2$-3[x]+2 =0 where[.] denotes the greatest integer integer function , then
(a) x∈ [2,3] (b) x ∈ (1,2]
(c) x∈ [1,2] (d) x∈ [1,3)

65. If f(x) -3f $\left(\frac{1}{x}\right)$= 2x+3(x≠ 0), *then* $f(3)$ *is equal to*
(a) $-\frac{3}{2}$ (b) $-\frac{5}{2}$
(c) $\frac{7}{2}$ (d) -1

66. The domain of the function f(x) = $\frac{sin^{-1}(3-x)}{In(|x|-2)}$
(a) [2,4] (b) (2,3) ∪ (3,4]
(c) [2, ∞) (d) $(-\infty, -3) \cup [2, \infty)$

67. The domain of *f(x)* = $\frac{log_2(x+3)}{x^2+3x+2}$ is
(a) R – {-1,-2) (b) (-2, ∞)
(c) R – {-1,-2, -3) (d) (-3,∞) – {-1,-2)

68. The domain of the function *f(x)*=$\left[log_{10}\left(\frac{5x-x^2}{4}\right)\right]^{1/2}$ is
(a) $-\infty < x < \infty$ (b) $1 \leq x \leq 4$
(c) $4 \leq x \leq 16$ (d) $-1 \leq x \leq 1$

69. The domain of *f(x)* = log|log *x*| is
(a) (0, ∞) (b) (1, ∞)
(b) (0,1) ∪ (1, ∞) (d) (-∞, 1)

70. The domain of the function f(x) = $\sqrt{log\left(\frac{1}{|\sin x|}\right)}$
(a) R-{-π, π} (b) R – {nπ|n ∈ Z}
(c) R – {2nπ|n ∈ Z} (d) (-∞, ∞)

71. The Range odf the function *f(x)*= |x-1|+|x-2|, $-1 \leq x \leq 3$
(a) [1,3] (b) [1,5]
(c) [3,-5] (d) none of these

72. Domain and Range of the function y = Sin x
(a) x∈ $R, y \in [-1,1]$ (b) x∈ $R, y \in (-1,1]$
(c) x≠ $R, y \in [-1,1]$ (d) x∈ $R, y \in (-1,1)$

73. Find the Number of solution $e^x = x^{2\backslash}$
    (a) 1 (b) 0
    (c) 2 (d) 4
74. Find the domain of the function f(x) = $\frac{si^{-1}(x-3)}{\sqrt{9-x^2}}$
    (a) (2,3) (b) [2,3)
    (c) [2,3] (d) [1,3]
75. If $x \in R - \{(2x+1)\frac{\pi}{2}, x \in \not{Z}\}$, $y \in (-\infty, 1] \cup [1, \infty)$ which function of domain and Range?
    (a) sin x (b) Sec x
    (c) Cosec x (d) tan x