DEPARTMENT OF SCHOOL EDUCATION

Government JEE Coaching- 2019-20

MILESTONE - 4

Time: 60 min

Marks: 180

Instructions:

1) Answer all the questions

2) For Every correct answer Four marks will be given

3) For Every wrong answer One mark will be deducted

CHOOSE THE CORRECT ANSWER **45x4=180**

1. The position of a particle along x axis at time ' t ' is given by x = 2+t-3t^2 . The displacement and the distance travelled in the internal , t = 0 to t= 1 s are respectively
   1. 2,2 2. −2,2.5 3. 0,2 4. −2, 2.1
2. The distance travelled by a particle starting from rest and moving with an acceleration $\frac{4}{3} ms^{-2}$ in the third second is
   1. 12 2. 9 3. 10 4. 1.8
3. The velocity r of a particle as a function of its position (x) is expressed as v = $\sqrt{c_1 - c_2 x}$, where c_1 and c_2 are positive constants. The acceleration of the particle is
   1. C_2 2. $\frac{c_2}{2}$ 3. $C_1 - C_2$ 4. $\frac{c_1 + c_2}{2}$
4. A body starts from rest, with uniform acceleration a, the acceleration of the body as function of time 't' is given by the equation a = pt, where p is the constant, then the displacement of the particle in the time interval t = 0 to t= t, will be
   1. $\frac{1}{2}pt^3$ 2. $\frac{1}{3}pt^2$ 3. $\frac{1}{2}pt^2$ 4 $\frac{1}{6}pt^3$
5. A particle moves along a straight line OX . After a time t (in seconds) the distance x = 40+12t- t^3 . How far would the particle travel before coming to rest ?
   1. 24m 2. 40m 3. 56m 4. 16m

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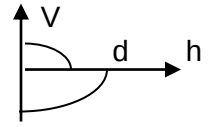
6. A boggy of uniformly moving train is suddenly detached from train and stops after covering some distance. The distance covered by the boggy and distance covered by the trainthe same time has relation
   1. Both will be equal
   2. First will be half of second
   3. First will be $\frac{1}{4}$ of second
   4. No definite ratio
7. A ball is thrown vertically upward with the speed v from a height h metre above the ground. The time taken for the ball to hit ground is
   1. $\frac{v}{g}\sqrt{1 - \frac{2hg}{v^2}}$
   2. $\frac{v}{g}\sqrt{1 - \frac{2gh}{v^2}}$
   3. $\sqrt{1 + \frac{2hg}{v^2}}$
   4. $\frac{v}{g}\sqrt{1 + \frac{2hg}{v^2}}$
8. A point mass moves in a straight line so that its displacement x at a time t is given by x^2 t^2 +1. Its acceleration is

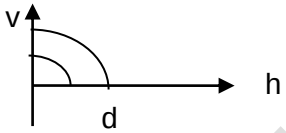
1. $\frac{1}{x}$ 2. $\frac{1}{x^2}$ 3. $-\frac{1}{x^2}$ 4. $-\frac{1}{x^3}$

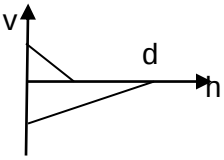
9 Water drops fall at regular intervals from tap which is 5m above the ground. The third drop is leaving the tap at the instant the first drop touches the ground. How far above the ground is the second drop at that instant (g = 10 ms^{-2})

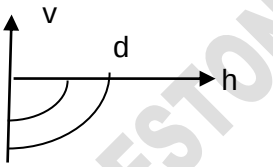
1. 2.50m 2. 3.75m 3. 4.00m 4. 1.25m

10 A ball is dropped vertically from a height d above the ground. It hits the ground and bounces up vertically to a height $\frac{d}{2}$. Neglecting subsequent motion and air resistance, its velocity v varies with the height h above the ground can be plotted as

1) 

2) 

3) 

4) 

11 The two ends of a train moving with constant acceleration passes certain point with velocities u and 3u. The velocity with which the middle point of the train passes the same point is

1. 2u 2. $\frac{3}{2}$ u 3. $\sqrt{5}$ u 4. $\sqrt{10}$ u

12 A body is projected vertically upward with speed 40 ms^{-1}. The distance travelled by body in the last second of upward journey is [take g = 9.8 ms^{-2}]

1. 4.9m 2. 9.8m 3. 12.4m 4. 19.6m

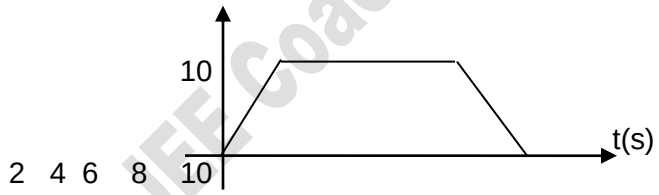
13 The position of a particle moving along x axis given by x =($-2t^3+3t^2$ +5)m. The acceleration of particle at the instant its velocity becomes zero is

1. 12 ms^{-2} 2. –12 ms^{-2} 3. –6 ms^{-2} 4. zero

14 A ball is dropped from abridge 122.5m above a river. After the ball has been falling for two seconds, a second ball is thrown straight down after it. Initial velocity of second ball so that both hit the water at the same time

1. 49 ms^{-1} 2. 55.5 ms^{-1} 3. 26.1 ms^{-1} 4. 9.8 ms^{-1}

15 The position time graph for a particle moving along a straight line is shown in figure. The total distance travelled by it in time t = 0 to t =10s is



1) 0 2) 10m 3) 20m 4) 80m

16 How many unpaired electrons are present in the ground state of Fe^{3+}

1. 5 unpaired electrons 2. 3 unpaired electrons
3. 7 unpaired electrons 4. None of these

17 Energy of an electron in hydrogen atom in ground state is -13.6 ev. What is the energy of electron in second exited state?

1. En = -1.51 ev 2. En = +1.51 ev
3. En = -1.77 ev 4. En = +1.77 ev

18 Which has stable electronic configuration of Ni^{2+} and Fe^{3+}

1. Ni^{2+} 2. Fe^{3+}

3. Ni^{2+} and Fe^{3+} 4. None of these

19 If uncertainty in position and momentum are equal, the minimum uncertainty in velocity is

1. 6.6×10^{-29} cm 2. 6.6×10^{-30} cm
3. 6.6×10^{-31} cm 4. 6.6×10^{-32} cm

20 Time independent of Schrodinger's wave equation is 1

1. $\hat{H}\Psi = E\Psi$ 2. $\hat{V}\Psi = E\Psi$
3. $\hat{H}\Psi = \hat{V}\Psi$ 4. All the above

21 The total spin resulting from a d^7 configuration has

1) ±½ 2) ±2 3) ±1 4) ± 3/2

22 The correct net of quantum numbers for the Outremont electron of Ru37 is

1) $5.0,0 \pm \frac{1}{2}$ 2) $4.3, 1\ \frac{-1}{2}$ 3) $5.1,0\ \frac{-1}{2}$ 4) $5.1,1\ I\frac{1}{2}$

23 The energy of the first electron in helium will be

1) -13.6ev 2) -54.7 ev 3) +54.4 ev 4) 0

24 As we move away from nucleus the energy of orbit

1. decreases 2. increases
3. remain unchanged 4. none of these

25 Ruther ford scattering experiment is related to the size of the

1. nucleus 2. atom 3. electron 4. neutron

26 The value of Planck's constant

1) $6.6\ 256 \times 10^{-27}$ erg. s 2) $66\ .256 \times 10^{-27}$ erg. s
3) 6.01×10^{-15} erg. s 4) 3.01×10^{-23} erg. $s^{-1`}$

27 The metal does not give photo electron easily

1. Li 2. Na 3. Ce 4. Cs

28 The fundamental particle which are responsible for keeping nuclear together

1. meson 2. antiproton 3. positron 4. electron

29 The ratio of energy the ionigation of H and Be is

1) 1:1 2) 1:3 3) 1: 9 4) 1:16

30 If r is the radius of First orbit the radius of n^{th} orbit of H- atom is

1. $r\,n^2$ 2. rn 3. r/n 4. $r^2\,n^2$

31 If A = { a, b}, B = { c, d}, C = { d, e}, then {(a, c),(a,,d), (a, e), (b, c),(b, d),(b,e)} is equal to

1) A∩(BUC) 2)AU(B∩C)
3)AX(BUC) 4)AU(B∩C)

32 Let Y = {1,,2,,3,4,5}, A = {1,2}, B= {3,4,5} and Ø denote the null set. If A x B denotes the cartesian product of sets A and B , then (Y x A) ∩(Y x B) is

1)Y 2)A
3)B 4)Ø

33 If P = {a,b,c } and Q = {1,2} then the total number of relations from P to Q which are not function is

1) 56 2) 8
3) 9 4) 53

34 Set A has 3 elements and Set B has 4 elements, the number of injections that can be defined from A to B is

1) 144 2) 12
3) 24 4) 64

35 If f : R→R is given by f(x) = 3x – 5, then $f^{-1}(x)$ is

1) $\frac{1}{3x-5}$ 2) $\frac{x+5}{3}$
3) does not exists because f is not one - one 4) does not exists because f is one - one

36 Let f (x) = x^2 and g (x) = 2^x then the solution set of the equation fog (x) = gof(x) is

1) R 3) [0]
3) [0,2] 4) None of the above

37 Let f (x) = $\frac{\alpha x}{X+1}$, x≠ -1 , then, for what value of α is f [f(x)]= x ?

1) √2 2) - √2
3) 1 4) -1

38 If f (x) = αx + β and f = { (1,1), (2,3), (3,5), (4,7)} then the value of α,β

1) 2,-1 2) -2, 1
3) 3, -1 4) -2,-1

39 The function f : R→R defined by f(x) = sin x is

1) Into 2) onto
3) one – one 4) many one

40 The domain of the function f(x) = $\frac{1}{\sqrt{|x|-x}}$

1) (-∞,0) 2) (-∞, ∞) – [0]
3) (-∞,∞) 4) (0 ,∞)

41 The domain of $\sqrt{4-x^2}$

1) (2 ,-2) 2) $[-2,2]$
3) (-∞,-2) ∪ (2,∞) 4) (-∞ ,2] ∪ [2 ,∞)

42 The domain of log (x-3) (5-x) is

1) (3,5) 2) (3,5)

3) (-∞,3) ∪ (5₁∞) 4) (-∞, 3) ∪ (5₁∞)

43 a) If f:R – {2} R→ is defined by f(x)= $\frac{2+x}{2-x}$ for x ϵ R-{2} then the range of f is 2 - x

1) R 2) R-{1}

3) R – {-1 } 4) R-{-2 }

44 The range of $\frac{x^2-4}{x-2}$

1) R 2) R – {2}

3) R – {±2} 4) R – {4}

45 The range of $\frac{x^2}{1+x^2}$

1) (0,1) 2) (0,1)

3) (0,∞) 4) [0,∞)

ANSWER KEY

1	4	16	1	31	3
2	1	17	1	32	4
3	2	18	2	33	1
4	4	19	3	34	3
5	3	20	1	35	2
6	2	21	4	36	2
7	4	22	1	37	4
8	2	23	2	38	1
9	2	24	2	39	4
10	1	25	1	40	1
11	3	26	1	41	2
12	1	27	1	42	2
13	3	28	1	43	2
14	3	29	4	44	4
15	3	30	1	45	1