DEPARTMENT OF SCHOOL EDUCATION
Government JEE Coaching- 2019-20
MILESTONE - 2

Time: 60 mins

Marks: 240

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   **60x4=240**

1. A small block slides without friction, down an inclined plane, starting from rest. Let S_n be the distance travelled from t= (n-1) to t = (n), then $\frac{S_n}{S_{n+1}}$

   1) $\frac{2n-1}{2n}$ 2) $\frac{2n+1}{2n-1}$

   3) $\frac{2n-1}{2n+1}$ 4) $\frac{2n}{2n+1}$

2. The velocity – displacement graph of a particle moving along a straight line is shown. The most suitable acceleration displacement graph will be

1)

2)
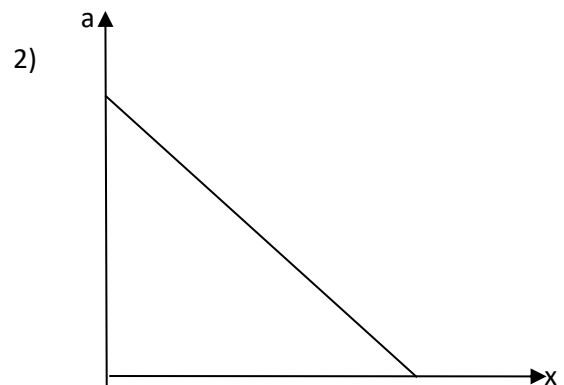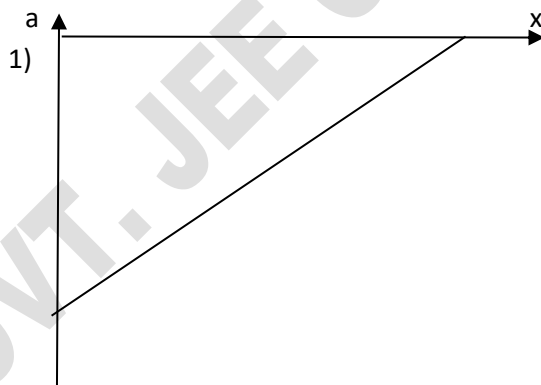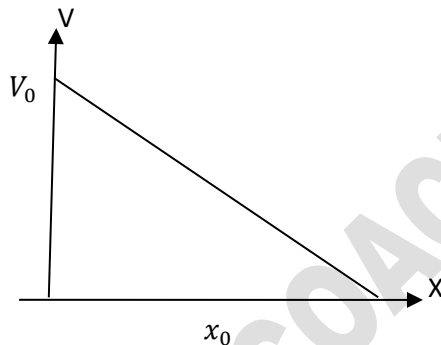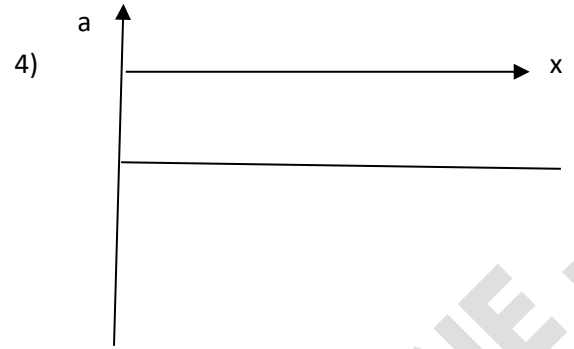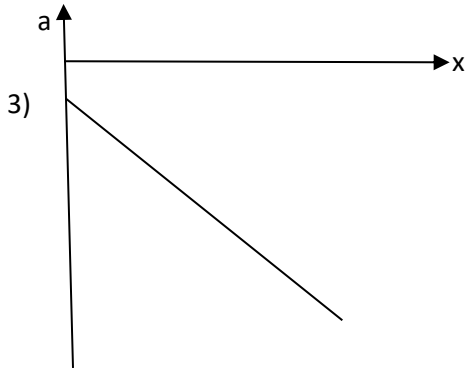
3   A bullet fired into a fixed target loses half of its velocity after penetrating 3cm, How much further will it penetrate before coming to rest assuming that it faces constant resistance in motion?
1) 1.5 cm   2) 1.0 cm   3) 3.0 cm   4) 2.0 cm

4   The velocity of a particle is V= $v_0 + gt + ft^2$. Its position is x=0 at t=0, then its displacement after time (t=1) is

1) $v_- + \frac{g}{2} + f$ 2) $v_0 + 2g + 3f$ 3) $v_0 + \frac{g}{2} + \frac{f}{3}$ 4) $v_0 + g + f$

5   A ball falls from 20 m height on a floor and rebounds to 5m. Time of the conduct is 0.02s. Find acceleration during impact. $[g = 10\ ms^{-2}]$
1) 1200 ms^{-2} 2) 1000 ms^{-2} 3) 2000 ms^{-2} 4) 1500 ms^{-2}

6)   The graph of displacement Vs time is
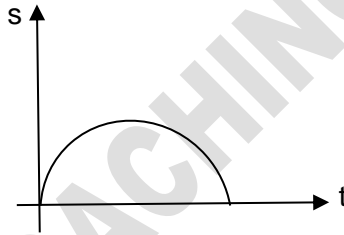
The corresponding velocity – time graph will be
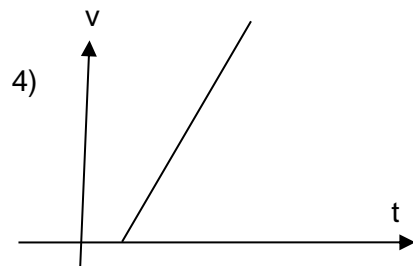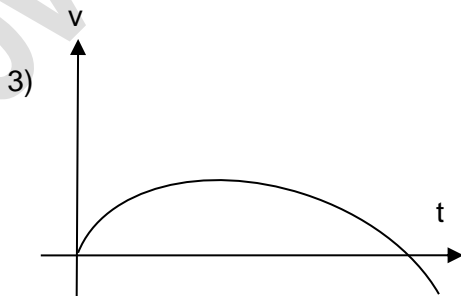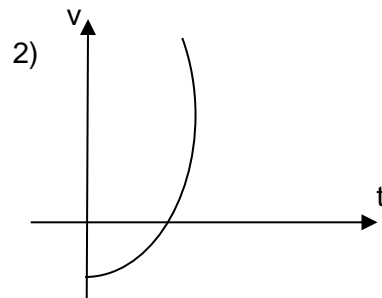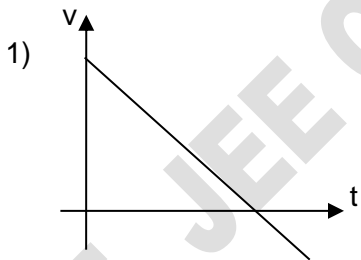
7	When a ball is thrown vertically with velocity v_0, it reaches a maximum height of 'h'. If one wishes to triple the maximum height, then the ball should be thrown with velocity
1) $\sqrt{3}\ v_0$ **2) 3 v_0**   3) $9v_0$ 4) $\frac{3v_0}{2}$

8	The body A starts from rest with acceleration a_1. After 2s another body B starts from rest with an acceleration a_2. If they travel equal distances in 5th second after the start of A, then the ratio $a_1: a_2$ is equal to
1) 5:9   2) 5:7   3) 9:5   4) 9:7

9	A particle starts from rest and has an acceleration of $2ms^{-2}$ for 10 s. After that, the particle travels for 30 s with constant speed and then undergoes a retardation of $4ms^{-2}$ and comes back to rest. The total distance covered by the particle is [$g = 10ms^{-2}$]
1) 650 m   **2) 700 m**   3) 750 m   4) 800 m

10	A bus travelling, the first one – third distance at a speed 10 kmph, the next one third at 20 kmph and at last one third at 60 kmph. The average speed of the bus is
1) 9 kmph   2) 16 kmph   3) 18 kmph   4) 48 kmph

11	A rubber ball is dropped from a height of 5m on a plane. On bouncing it rises to 1.8 m. The ball losses its velocity on bouncing by a factor
1) $\frac{3}{5}$ **2) $\frac{2}{5}$**   3) $\frac{16}{25}$ 4) $\frac{9}{25}$

12	A body dropped from top of a tower falls through 40 m during the last two seconds of its fall. The height of tower is [$g = 10ms^{-2}$]
1) 60 m   **2) 45 m**   3) 80 m   4) 50 m

13	A particle moves in straight line covers half the distance with speed of $3ms^{-1}$ the other half of the distance is covered in two equal time intervals with speed of $4.5ms^{-1}$ and $7.5ms^{-1}$, respectively. The average speed of the particle during this motion is
1) $4.0ms^{-1}$ 2) $5.0ms^{-1}$ 3) $5.5ms^{-1}$ 4) $4.8ms^{-1}$

14	A drunkard takes a step of 1m in 1 second. He takes 5 seconds steps forward and 3 seconds steps backwards and so on. The time taken by him to fall in a pit 13m away from the starts is
1) 26 s   **2) 31 s**   3) 37 s   4) 41 s

15	A particle is moving along a circle such that it completes one revolution in 40 s. In 2 minutes 20 s the ratio $\frac{|displacement|}{distance}$ is
1) 0   **2) $\frac{1}{7}$**   3) $\frac{2}{7}$ 4) $\frac{1}{11}$

16	The Heaviest particle is
1) Meson   2) Neuron   3) Proton   4) Electron

17	Which has the highest ionising power
1) α rays   2) $\beta\ rays$ 3) γ rays   4) all of these

18	The radius of second Bohr orbit
1) 0.053 nm   2) 0.0534 nm   3) 0.053 X 4 nm   4) 0.053 X 20 nm

19	The spectrum of He^+ is expected to be similar to that of
1) H   2) Li^+ 3) Na   4) He

20	The metal which gives photo electron most easily in
1) Li   2) Na   3) Ca   4) Cs

21	The ratio of radius of 3rd and 4th Bohr orbit in hydrogen atom is
1) 3:4   2) 3:8   3) 9:16   4) 8:9

22	The total number of nodes are given by
1) l 2) n-1   3) n-l-1   4) n-l

23	The orbital angular momentum of a 'p' electron is given as
1) $\frac{h}{\sqrt{2}\pi}$ 2)$\sqrt{3}\ \frac{h}{4\pi}$ 3) $\sqrt{\frac{3}{2}}\frac{h}{\pi}$ 4) $\frac{\sqrt{6}\ h}{2\pi}$

24	The radius of the atom is of the order of
1) 10^{-10}cm   2) 10^{-13}cm   3) 10^{-15}cm   4) 10^{-8}cm

25	The total spin resulting from a 'd^7' configuration
1) $\pm\frac{1}{2}$ 2) ± 2 3) ± 3 4) $\pm\frac{3}{2}$

26 If ionization energy of 'H' atom is 13.6V than ionization energy of He^+ ion is

1) 13.6 ev   2) 27.2 ev   3) 6.8 v   4) 54.4 ev

27 The quantum number for the first electron in an atom are n=3, l=1, m= -1 the atom is
1) Al   2) Si   3) Mg   4) C

28 Splitting of spectral lines under the influence of electrical field is

1) Stark effect   2) Zeeman effect   3) Photo electric effect   4) None of these

29 What will be the longest wave length is Balmer series of spectrum
1) 546 nm   2) 656 nm   3) 566 nm   4) 556 nm

30 The uncertainty in momentum of an electron is 1 X10^{-5} kg m/s. The uncertainty in its position is h=6.62X10^{-34} kgm^2/s
1) 5.27 X 10^{-30} m   2) 1.05 X 10^{-26} m   3) 1.05 X 10^{-28} m   4) 5.25 X 10^{-28} m

31 $The\ value\ of\ \sum\limits_{n=1}^{13}(i^n + i^{n+1}), where\ i = \sqrt{-1}\ , equals$

1) i 2) i-1   3) - i 4) 0

32 The conjugate of complex number is $\frac{1}{i-1}$, then the complex number is?

1) $\frac{-1}{i+1}$ 2) $\frac{1}{i-1}$ 3) $\frac{-1}{i-1}$ 4) $\frac{1}{i+1}$

32 Taking the value of the square root with positive real part only, the value of $\sqrt{7 + 24i}$ + $\sqrt{-7 - 24i}$ is
1) $1 + 7i$ 2) $-1 - 7i$ 3) $7 - i$ 4) $-7 + i$

34 If z_1, z_2 be any two non- zero complex numbers such that $|z_1 + z_2| = |z_1|+ |z_2|$, then any org ($z_1$) - org ($z_2$) is equal to
1) $-\pi$ 2) $-\frac{\pi}{2}$ 3) 0   4) $\frac{\pi}{2}$

35 If arg $(Z) < 0$, then arg $(- Z) - $ arg $(Z) = ?$
1) π 2) $-\pi$ 3) $-\frac{\pi}{2}$ 4) $\frac{\pi}{2}$

36 If z_1, z_2, z_3 are complex numbers such that
$|z_1| = |z_2|=|z_3| = \left|\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3}\right| = 1$ then $|z_{1+z_2+z_3}|$ is
1) equal to 1   2) less than 1   3) greater than 1   4) equal to 3

37 If $|z^2 - 1|= |z|^2 + 1$ then Z lies on a/an
1) circle   2) parabola   3) ellipse   4) none of these

38 If ω ($\neq 1$) is a cube root of unity and $(1 + \omega)^7$ = A+B ω, then (A,B) equals
1) (0,1)   2) (1,1)   3) (1,0)   4) (-1,1)

39 $\frac{(1+i)^{2011}}{(1-i)^{2009}} = ?$
1) -1   2) 1   3) 2   4) -2

40 If $x+ iy = \frac{1}{1+\cos\emptyset+i\sin\emptyset}$ then $4x^2 = ?$
1) 0   2) 1   3) 2   4) 3

41 If w is a complex cube root of unity then
$\omega^{\left(\frac{1}{3}+\frac{2}{9}+\frac{4}{27}...\infty\right)} + \omega^{\left(\frac{1}{2}+\frac{3}{8}+\frac{9}{32}+\cdots\infty\right)}$
1) 1   2) -1   3) ω 4) i

42 $Z = 1+i\sqrt{3} \Rightarrow |arg\ z| + |arg\ \vec{z}| = ?$
1) 0   2) $\frac{\pi}{3}$ 3) $\frac{\pi}{2}$ 4) $\frac{2\pi}{3}$

43 If $|z + \vec{z}|+|z - \vec{z}| = 2$ then 'Z' lies on
1) a straight line   2) a square   3) a circle   4) None

44 If the amplitude of Z = 2−3i is $\frac{\pi}{4}$ then the locus of z= x+ iy is
1) x+y-1=0   2) x-y-1=0   3) x+y+1=0   4) x-y+1=0

45 The triangle formed by the points 1, $\frac{1+i}{\sqrt{2}}$ and i as vertices in the argand diagram is
1) scalene   2) equilateral   3) isosceles   4) right-angled

ANSWER KEY

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