DEPARTMENT OF SCHOOL EDUCATION

Government JEE Coaching- 2019-20

UNIT TEST- 2

Time: 60 min

Marks: 180

Instructions:

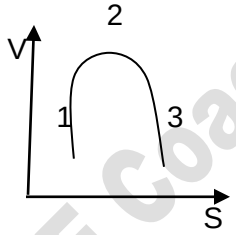
1) Answer all the questions

2) For Every correct answer Four marks will be given

3) For Every wrong answer One mark will be deducted

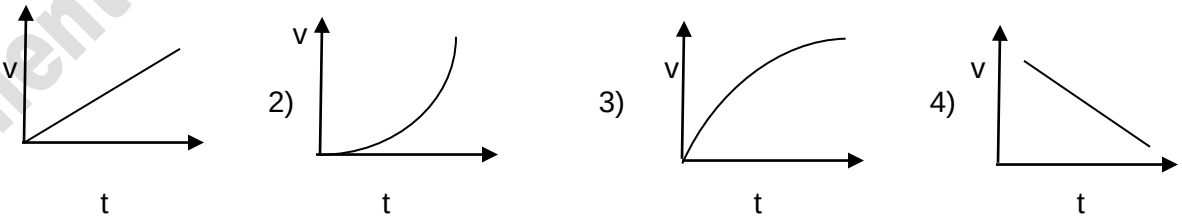
CHOOSE THE CORRECT ANSWER **45x4=180**

1. $\vec{A} = \hat{\imath} + \hat{\jmath} + \hat{k}$ and $\vec{B} = -\hat{\imath} - \hat{\jmath} - \hat{k}$ The angle made by $(\vec{A} - \vec{B})$ with $\vec{A}$ is
   1)0° 2) 180° 3) 90° 4) 60°
2. Vector sum of forces 2 forces is perpendicular to their difference. In this case forces
   1)Cannot be found out 2) Will be orthogonal to each other
   3) equal in magnitude 4) will not be equal in magnitude
3. $\vec{A} + \vec{B} + \vec{C} = 0$. If so what is $\vec{A}X\vec{B}$
   1) $\vec{B}X\vec{C}$ 2) $\vec{C}X\vec{B}$ 3) $\vec{A}X\vec{C}$ 4) None of these
4. The velocity displacement graph of a particle is shown below. At what point does the velocity of the object increase



   1)1 2) 2 3) 1 and 3 4) 2 and 3

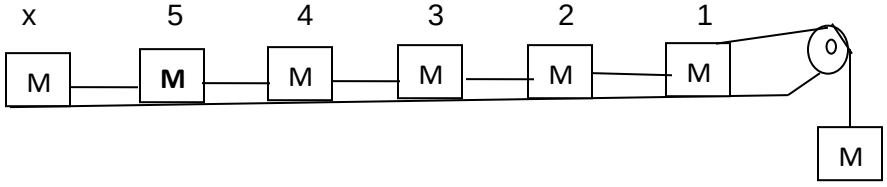
5 The v – t graph of an object falling fear rest is



6. V---------- gives the velocity of the particle. At t = 0, x =0. After an interval of 1 second the displacement of the particle is (t = 1&)
   1)----+$\frac{g}{2}$+f 2) ---- + 2g+3f 3) ----+ $\frac{g}{2} + \frac{f}{3}$ 4)---- +g+f
7 Let us say that a projectile has same range for different angles of projection . Let us say that the time of flight in this case are 't', and 't_2' respectively. If so, what is the product of their time of flights
   1)t_1t_2--- R^2 2) t_1t_2--- R 3) t_1t_2---$\frac{1}{R}$ 4) t_1t_2---$\frac{1}{R^2}$

8 ASSERTION : When a particle moves with a uniform circular motion, it has two components of acceleration namely radial (centripetal) and tangential acceleration
REASON : Along an uniform circular motion, acceleration is an irregular (non-uniform)vector
1)Both Assertion and reason are true; Reason is the correct explanation for Assertion
2)Both Assertion and reason are true but reason is notthe correct explanation for Assertion
3)Assertion true; Reason false
4)Reason true; Assertionfalse

9 x 5 4 3 2 1



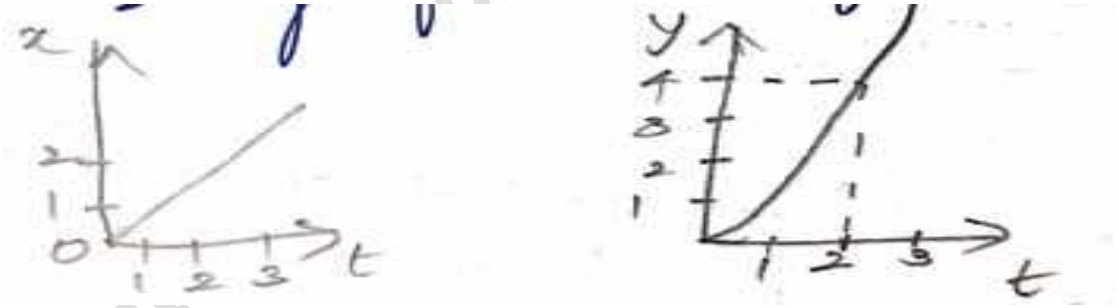
Equal masses are tied by means of a thin were in the system above. The tension in the string connected to n^{th} mass is
1)$\frac{mMg}{nm+M}$ 2) $\frac{mMg}{nmM}$ 3) mg 4) mng

10 The force applied moves the particle in the x – y plane. The particles linear momentum is given by $\vec{p}$(t) = A $\cos\{ i\cos(kt) - j\, sin(kt)\}$. Find the angle between force and momentum
1) 0° 2) 30° 3) 90° 4) 45°

11 Two forces 8N and 6N act perpendicular with each other on a 5kg mass. Find the acceleration of the particle and its direction
1)2 ms^{-2} , 37° 2) 20ms^{-2} ,45° 3) 14 ms^{-2} ,20° 4) None of the above

12 A Bomb at rest explodes into 3 parts in their mass ratio 1:1:3 . Equal masses move Perpendicular to each other with a velocity of bigger part
1)$10\sqrt{2}\, m/s$ 2) $\frac{10}{\sqrt{2}}$ m/s 3) $15\sqrt{2}\, m/s$ 4) $\frac{15}{\sqrt{2}}$ m/s

13 The graph below shows the motion of a particle in (x,t) (y,t) motion. If the mass of the particle is 500g find the force acting on the particle



1)1 N along y direction 2) 1 N along x axis
3)0.5N along x axis 4) 0.5N along y axis

14 A ball rises up and goes down on an upstairs. It rises to the next step of height h and goes down comparing the height of the stairs with its width ‘d’ it causes an elastic dimensional (1-D) collision. The relation between ‘h’ and ‘d’ is
1)h = $\frac{d}{1+e^2}$ 2) h = $\frac{d}{1-e^2}$ 3) h = $\frac{d}{1+e}$ 4)h =$\sqrt{\frac{d}{1+e^2}}$

15 A wooden block of mars on collides with another wooden block of mass 2m. The lesser mass lomes to rest. If the velocity of the first block is v find the value of coefficient of restitution
1)0.8 2) 0.4 3) 0.6 4) 0.5

16 The statement that is not correct for periodic classification of elements is
1) The properties of elements are periodic function of their abomic numbers
2) Non metallic elements are less in number than metallic elements

3) For transition elements, the 3^d – orbitals are filled electrons after 3p – orbitals and before4s - orbitals

4)The first ionisation enthalpies of elements generally increase with in atomic number as we go along a period

17 The formation of the oxide ion, o^{2-} (g) from oxygen atom requires first an exothermic and then an endothermic step as shown below

$o(g) + e^{--} \rightarrow o^{—}(g)$ $H^v = 141$ KJ mol $^{-1}$

$o(g) + e^{--} \rightarrow o^{2--}(g)$ $H^v = +780$ KJ mol $^{-1}$

Thus process of formation of $o^{2—}$ in gas phase is unfavourable even though $o^{2—}$ is isoeletronic with heon . It is due to the fact that

1) Oxygen iis more electronegative

2) Addition of electron in oxygen results in longer size of the ion^{--}

3) Electron repulsion out weighs the stability gained by achieving noble gas configuration

4) o^{--} ion has comparatively smaller size than oxygen alone

18 Consider the isoelectronic species Na^+ , Mg^{2+} , $F^{—}$ and O^{2--}. The correct order of increasing length of their radii is ----------

1) $F < o^{2--} < Mg^{2+} < Na^+$ 2) $Mg^{2+} < Na^+ < F^{--} < o^{2--}$

3) $< o^{2--} < F^{--} < Na^+ < Mg^{2+}$ 4) $< o^{2--} < F^{--} < Mg^{2+} < Na^+$

19 Electronic configuration of four elements A,B,C, and D are given below

1) $1S^2\ 2S^2\ 2P^6$ 2) $1S^2\ 2S^2\ 2P^4$

3) 1) $1S^2\ 2S^2\ 3S^1$ 4) $1S^2\ 2S^2\ 2P^5$

Which of the following is the correct order of increasing tendency to gain electron

1) A < C < B < D 2) A < B < C < D 3) D < B < BC< A 4) D < A < B < C

20 Total number of lone pair of electron in $XeoF_4$ is

1) 0 2) 1 3) 2 4) 3

21 Which of the following is an electron deficient molecule

1) $C_2 H_6$ 2) PH_3 3) B_2H_6 4) SIH_4

22 Number of p – o honds in $P4o_{10}$ is

1) 17 2) 16 3) 15 4) 6

23 Of the following sets which does not contain isoelectronic species

1) $SO3^{2-}$, $Co3^{2-}$, $No3^{--}$ 2)$CN^{—}$, N_2 , $C2^{2--}$ 3) $BO3^{3--}$, $Co3^{2-}$, $No3^{--}$ 4) $PO4^{3--}$, $SO4^{2-}$, $CLO4^{--}$

24 The ion which is not tetrahedral in shape is

1) $BF4^{---}$ 2) $NH4^+$ 3) $[Ni(CN)_4]^{2-}$ 4) $NiCl_4{}^{2-}$

25 How many sigma and pi bonds are present in toluene

1) $3\pi + 15\sigma$ 2) $6\pi + 6\sigma$ 3) $33\pi + 6\sigma$ 4) $3\pi + 8\sigma$

26 The acid having 0 – 0 bond is

1) H_2S_2O3 2) H_2S_2O6 3) H_2S_2O8 4) H_2S_4O6

27 Among the following compounds, the one that is polar and has the central atom with sp^2 hybridization is

1) H_2co3 2) SIF_4 3) BF_3 4) $HclO_2$

28 Match the following

LIST I (Compounds)	LIST II (Structure)
1) CS_2	Bent
2) SO_2	Linear
3) BF_3	Trigonal planner
4) NH_3	Tetrahedral
	Trigonal pyramidal

The correct matching is

	1	2	3	4
1)	(1)	(2)	(4)	(5)
2)	(2)	(1)	(3)	(5)
3)	(1)	(2)	(5)	(4)
4)	(2)	(1)	(5)	(4)

29 In which of the following pairs molecules/ions have similar shape
1) ccl_4 and $ptcl_4$ 2) NH_3 and BF_3
3) BF_3 and t – butyl canbonium ion 4) Co_2 and H_2o

30 Pick out the isoelectronic structures from the following
1)$CH_3°$ 2) H_3O^+ 3)NH_3 4) $CH_2°$
a) 1 and 3 b) 3 and 4 c) 1 and 3 d) 2,3 and 4

31 If $\propto$ and β are different complex numbers with $|\beta| = 1$ then $\left|\frac{\beta-\propto}{1-\bar{\propto}\beta}\right|$ =
1) 0 2) 1/2 3) 1 4) 2

32 If z = x – iy and $z^{\frac{1}{3}}$ = p+iq, then $(\frac{x}{p}+\frac{y}{q})$ / (p^2+q^2) =
1) 1 2) -2 3) 2 4) -1

33 If x = -5+4i, then $x^4+9x^3+35x^2-x+4$=
1) -170 2) 160 3) 170 4) -160

34 If $(1+x+x^2)^n = a_0+a_1x+a_2x^2+\ldots\ldots+a_{2n}x^{2n}$, then $a_0+a_3x+a_6+\ldots\ldots$ is
1)1 2)2^n 3)2^{n-1} 4)) 3^{n-1}

35 If 1, w, w^2 are the cube roots of unity and if $\propto = w+2w^2 -3$, then $\propto^3+12\propto^2-3$, then $\propto^3+12\propto^2+48\propto+3$=
1)-63 2) -62 3) -61 4) -60

36 If $\frac{\sin(x/2)+\cos(x/2)+\text{itan}\,x}{1+2isin\,(\frac{x}{2})}$ is real, then x is
1)$n\pi or\ n\pi+\frac{\pi}{4}$ 2) $2n\pi\ or\ n\pi+\frac{\pi}{4}$ 3) $n\pi\ or\ n\pi+\frac{\pi}{2}$ 4) none

37 $\tan\{i\log(\frac{a-ib}{a+ib})\}$ =
1)ab 2) $\frac{2ab}{a^2-b^2}$ 3) $\frac{a^2-b^2}{2ab}$ 4) $\frac{2ab}{a^2+b^2}$

38 A complex number z is said to be unimodular if $|z|$=1. Suppose z_1 and z_2 are complex numbers such that $\frac{z_1-2z_2}{2-z_1\bar{z}_2}$ is unimodular and z_2 is not unimodular. Then the point z_1 lies on a
1) straight line parallel to x-axis 2) straight line parallel to y-axis
3) circle of radius 2 4) circle of radius $\sqrt{2}$

39 If a and b are real numbers between 0 and 1 such that the point z_1 = a+i, z_2 = 1+bi and z_3 = 0 from an equilateral triangle, Then a and b are
1) $2+\sqrt{3}$, $2-\sqrt{3}$ 2) $2+\sqrt{3}$, $2+\sqrt{3}$ 3) $2-\sqrt{3}$, $2-\sqrt{3}$ 4) none

40 If a,b,c,p,q,r are non – zero complex numbers such that $\frac{p}{a}+\frac{q}{b}+\frac{r}{c}$ = 1+i and $\frac{a}{p}+\frac{b}{q}+\frac{c}{r}$ = 0, then value of $\frac{p^2}{a^2}+\frac{q^2}{b^2}+\frac{r^2}{c^2}$ is
1)0 2) -1 3) 2i 4) -2i

41 If a is a complex number and b is a real number, then the equation $\bar{a}$ z + a$\bar{z}$ + b = 0 represents a
1) straight line 2) parabola 3) circle 4) hyperbola

42 If k > 0 and the product of roots of the equation x^2 – 3kx + $2e^{2\log k}$ – 1= 0 is 7, then the sum of the roots is
1) 2 2) 4 3) 6 4) 8

43 Let $\propto$ and β be the roots of the equation x^2 + x + 1 = 0. Then equation whose roots are $\propto^{19}$, β^7 is
1)x^2 – x -1 = 0 2) x^2 – x + 1 = 0 3) x^2 + x -1 = 0 4) x^2+ x + 1 = 0

44 If $\propto + \beta$ = -2 and $\propto^3+\beta^3$ = -56, then the quadratic equation whose roots are $\propto$ and β is
1) x^2 + 2x – 16 = 0 2) x^2 + 2x – 15 = 0 3) x^2 + 2x – 12 = 0 4) x^2 + 2x – 8 = 0

45 The value of 'a' for which one root of quadratic equation (a^2 – 5a+3) x^2+ (3a-1) x + 2 = 0 is twice as large as the other is
1) $\frac{-2}{3}$ 2) $\frac{1}{3}$ 3) $\frac{-1}{3}$ 4) $\frac{2}{3}$

ANSWER KEY

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