DEPARTMENT OF SCHOOL EDUCATION

Government JEE Coaching- 2019-20

UNIT TEST- 1

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**

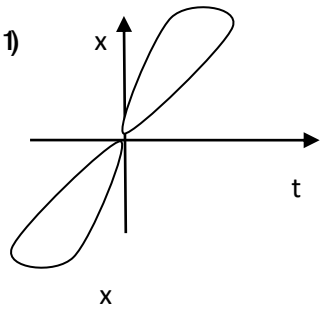
1. In the relation y= rsin (wt+kx) the dimensional formula for kx (or) wt same as
   1) $\frac{r}{w}$ 2)) $\frac{r}{y}$ 3)) $\frac{wt}{r}$ 4) $\frac{yr}{wt}$
2. Length can not be measured by
   1) Fermi 2) debye 3) micron 4) Light year
3. SONAR emits which of the following waves
   1) radio 2) light 3) Ultra sound 4) none of these
4. The velocity v of a particle at time 't' is given by $v = at + \frac{b}{t+c}$ where a,b and c are constants .The dimensions of a,b and c are
   1) $[L]$, $[LT]$ and $[LT^2]$ 2) $[LT^2]$, $[L]$ and $[T]$
   3) $[L^2]$, $[T]$ and $[LT^{-2}]$ 4) $[LT^{-2}]$, $[LT]$ and $[L]$
5. Percentage errors in the measurement of mass and speed are 2% and 3% respectively. The error in the estimate of kinetic energy obtained by measuring mass and speed will be
   1) 8% 2) 2% 3) 12% 4) 10%
6. The angle subtended by a coin of radius 1 cm held at a distance of 80 cm from your eyes is
   1) $\frac{1}{20}$ radian 2) $\frac{1}{30}$ radian 3) $\frac{1}{40}$ radian 4) $\frac{1}{80}$ radian
7. If the dimension of a physical quantity are given by $M^aL^bT^c$ then the physical quality will be
   a) Velocity if a=1, b=0, c= -1
   b) Acceleration if a=1, b=1, c= - 2
   c) Force if a=0, b= -1, c= - 2
   d) Pressure if a=1, b= -1, c= - 2
8. The velocity – time relation of an electron starting from rest is given by $v = kt$ where $k = 2\,m/s^2$ .Calculate the distance travelled in 3 seconds.
   1) 6 m 2) 7 m 3) 8 m 4) 9 m
9. If in case of motion, displacement is directly proportional to square of time elapsed, If the constant of proportionality is $5\,m/s^2$. Find the acceleration
   1) $5\,m/s^2$ 2) $10\,m/s^2$ 3) $15\,m/s^2$ 4) $20\,m/s^2$
10. A ball is released from top of a tower of height h metres. It takes T seconds to reach the ground . What is the position from ground m $\frac{T}{3}$ seconds
    1) $\frac{8h}{9}$ 2) $\frac{4h}{9}$ 3) $\frac{h}{3}$ 4) $\frac{10h}{6}$
11. Points P, Q and R are in vertical line such that PQ=QR. A ball at P is allowed to fall freely.What is the

ratio of times of descent through PQ and QR?

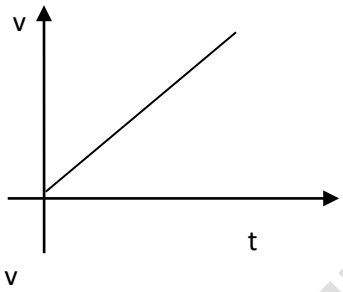
1) $1:(\sqrt{2}-1)$ **2)** $\sqrt{2}:\sqrt{2}-1$ **3)** $1:\sqrt{2}$ **4)** $\sqrt{2}+1:1$

12 Which of the following graphs can not be positive in one dimensional motion of a particle

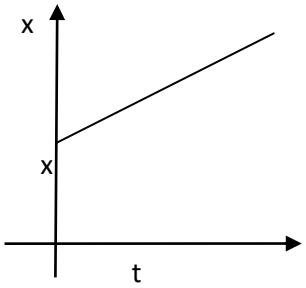
1)



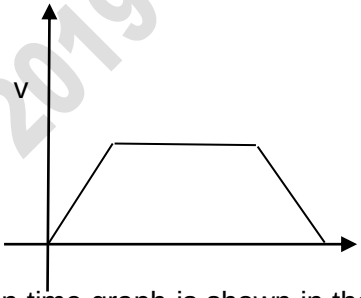
2)



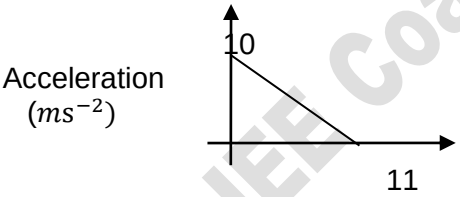
3)



4)



13 A body starts from rest at time t = 0, the acceleration time graph is shown in the figure. The maximum velocity attained by the body will be



1) $110\,\mathrm{m/s}$ 2) $55\,\mathrm{m/s}$ 3) $650\,\mathrm{m/s}$ 4) $550\,\mathrm{m/s}$

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

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

15 A parachutist after bailing out falls 50m without friction. When parachute opens, it decelerates at $2ms^{-2}$. He reaches the ground with a speed of $3ms^{-2}$. At what height, did he bail out ?

1) $293\,m$ **2)** $111m$ **3)** $91m$ **4)** $182m$

16 Mg of a substance when vapourshed occupy a volume 5.6 litre at NTP. The mollular mass of the substance is

1) M 2) 2M 3) 3M 4) 4M

17 What is the weight of oxygen required for the complete combustion of 2.8 kg of elleyline

1) 2.8kg 2) 6.4kg 3) 9.6kg 4) 96kg

18 What is the empirical formulae of a compound compared of oxygen and manganese in equal weight ratio
1) MnO 2) MnO_2 3) Mn_2o_3 4) Mn_2o_7

19 Normality of 2M sulphuric acid is
1) 2N 2) 4N 3) $^{N}/_{2}$ 4) $^{N}/_{4}$

20 The hydrolysed salt $Na_2CO_3 .nH_2o$ undergoes 63% loss in mass on heating and becomes amorphous. The value of n is
1) 4 2) 6 3) 8 4) 10

21 Maximum number of molecules will be in
1) 1g of H_2 2) 10g of N_2 3) 24g of o_2 4) 44g of co_2

22 Calculate the Molarity of liquid HCl , if the density of solution is 1.17g/ce
1) 32.05 2) 12.15 3) 3.05 4) 22.10

23 The d – orbital with orientation along x and y axes is called
1) $d2^2$ 2) dxy 3) dyz 4) $dx^2 – y^2$

24 For a d – orbital, the orbital angular momentum is
1) $\sqrt{b}\ \frac{h}{2\pi}$ 2) $\sqrt{2}\ \frac{h}{2\pi}$ 3) $\frac{h}{2\pi}$ 4)zero

25 How many special lines are produced in the spectrum of hydrogen atom from 5^{th} energy level
1) 5 2) 10 3) 15 4) 4

26 Which wave properly is directly proportional to energy of electro magnetic radiation
1)Velocity 2) frequency 3) wave number 4) all of these

27 Set of isoelectonic species is
1) H_2, co_2, CN^{-}, O^{-} 2) N, H_2S, CO 3) N_2, CO, $CN^{-}, o2^{2+}$ 4) Ca, Mg, cl

28 l = 3, their the value of magnetic quantum numbers are
1) $\pm1, \pm2, \pm3$ 2) 0, $\pm1, \pm2, \pm3$ 3) -1, -2, -3 4) 0, +1, +2, +3

29 The radius of hydrogen atom is 0.53 A°. The radius of Li^{2+} is of
1)1.27 A° 2) 0.17 A° 3) 0.57 A° 4) 0.99 A°

30 The electron density between 1s and 2s orbital is
1) High 2) Low 3) zero 4) none of these

31 An investigator interviewed 100 students to determine their preferences for the three drinks : milk (M), coffee (C) and Tea (T). He reported the following : 10 students had all three drinks, 20 had M and C only, 30 had C and T, 25 had M and T, 12 had M only, 5 had C only, 8 had T only. Find how many did not take any of three drinks
1)20 2) 3 3) 36 4) 42

32 If x = $\langle 4^n - 3n - 1 : n \in N \rangle$, $Y = \{9(n-1)\ n \in N\}$ where N is the set of natural numbers then X U Y is equal to
1) X 2) Y 3) N 4) Y- X

33 Two finite sets have m and n elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set. The value of m and n are
1)7,6 2) 6,3 3) 5,1 4) 8,7

34 A = $\{(x, y), y = e^x, X \in R\}$, B = $\{(x, y); y = x, x \in R\}$ then
1)B⊂A 2) A⊂B 3) A∩ $B = \emptyset$ 4) A∩ $B = A$

35 Let A and B be two sets containing four and two elements respectively. Then the number of subsets of the set A X B each having at least three elements is
1) 219 2) 256 3) 275 4) 510

36 For n, m ∈N, n l m means n is a factor of m, be relation is
1) reflexive and symmetric 2) transitive and symmetric
3) reflexive, transitive and symmetric 4) reflexive, transitive and not symmetric

37 Let R = $\{(x, y) : x, y \in A, x + y = 5\}$ A = $\{1,2,3,4,5\}$ then
1)R is not reflective, symmetric and not , transitive 2) R is an equivalence relation
3) R is reflexive, symmetric but not transitive 4) R is not reflexive not symmetric but transitive

38 If R and S are two symmetric relation then

1)RoS is a symmetric 2) SoR is a symmetric
3) RoS^{-1} is a symmetric 4)RoS is a symmetric relation if and only if RoS=SoR

39 The number of linear function which map from $[-1,1]$ onto $[0,2]$ is
1) 0 2) 1 3) 2 4) infinite

40 If f(x) = $\frac{\cos^2 x+\sin^4 x}{\sin^2 x+\cos^4 x}$ for x ∈R then f (2019)
1) 1 2) 2 3) 3 4) 4

41 If f : R→R is defined by f (x) = 2x + $|x|$ then f (2x) + f (-x) - f(x) =
1) 2x 2) 2$|x|$ 3) -2x 4) -2$|x|$

42 A function f : N → Z defined by f (x) = $\frac{n-1}{2}$ when n is odd and f (n) = $\frac{-n}{2}$ when n is even
1) one one but not onto 2) onto but not one one
3) one one onto 4) neither one – one nor onto

43 If f satisfies the relation f (x+y) + $f(y-x) = 2f(x), f(y)$ x, y ∈ R and f $(0) \neq 0$. Then f(10) – f(-10) =
1) 0 2) 1 3) 2 4) 3

44 The domain of the function f(x) = $\frac{2x+3}{\sqrt{(x-2)(3-x)}}$ is
1)(2,3) 2) (-2,-3) 3) (-∞,-2) ∪ $[4,\infty)$ 4) (-∞,-2) ∪ $[3,\infty)$

45 The range of f(x) = $\sin^{-1} x$ + $\cos^{-1} x$ + $\tan^{-1} x$ is
1) (0,π) 2) $\left[\frac{\pi}{4},\frac{3\pi}{4}\right]$ 3) $\left[\frac{-\pi}{4},\frac{\pi}{4}\right]$ 4) $\left[0,\frac{3\pi}{4}\right]$

ANSWER KEY

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

ANSWER KEY

1	2	16	4	31	2	46	1
2	2	17	3	32	4	47	3
3	3	18	4	33	1	48	1
4	2	19	2	34	1	49	1
5	1	20	4	35	2	50	2
6	3	21	4	36	4	51	1
7	4	22	1	37	2	52	4
8	4	23	4	38	4	53	4
9	2	24	1	39	1	54	3
10	1	25	2	40	4	55	3
11	1	26	4	41	1	56	1
12	1	27	3	42	3	57	1
13	2	28	2	43	3	58	3
14	3	29	2	44	4	59	4
15	1	30	3	45	1	60	2