**DEPARTMENT OF SCHOOL EDUCATION**

**Government JEE Coaching- 2019-20**

**SMALL TEST**

 **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. | A force F is given by F=at+$bt^{2}$, where ‘t’ is time, The dimensions of ‘a’ and ‘b’ are |
|  | 1) $\left[MLT^{-3}\right]$ and $\left[MLT^{-4}\right]$  | 2) $\left[MLT^{-4}\right]$ and $\left[MLT^{-3}\right]$  |
|  | 3) $\left[MLT^{-1}\right]$ and $\left[MLT^{-2}\right]$  | 4) $\left[MLT^{-2}\right]$ and $\left[MLT^{0}\right]$  |
| 2 | With usual notation, the following equation said to give the distance covered in ‘n’ th sec (i.e) $S\_{n }=u+a \left(\frac{2n-1}{2}\right) $ in |
|  | 1) Only numerically correct | 2) Only dimensionally correct |
|  | 3) Both dimensionally and numerically correct | 4) Neither numerically nor dimensionally correct |
| 3 | The velocity ‘v’ of a particle at time ‘t’ is given by v= $at^{2}$+bt+c, where ‘t’ is time. What are the dimensions of a,b and c respectively? |
|  | 1) $\left[LT^{-3}\right]$,$ \left[LT^{-2}\right]$ and $\left[LT^{-1}\right]$ | 2) $\left[LT^{-1}\right]$,$ \left[LT^{-2}\right]$ and $\left[LT^{-3}\right]$ |
|  | 3) $\left[LT^{-2}\right]$,$ \left[LT^{-3}\right]$ and $\left[LT^{-1}\right]$ | 4) $\left[LT^{-1}\right]$,$ \left[LT^{-3}\right]$ and $\left[LT^{-2}\right]$ |
| 4 | The frequency of vibration of string is given by f=$\frac{P}{2l}$ $\left[\frac{F}{m}\right]^{\frac{1}{2}}$ Here ‘p’ is number of segments in the string and ‘l’ is the length. The dimensional formula for ‘m’ will be |
|  | 1) $\left[M^{0}LT^{-1}\right]$ | 2) $\left[ML^{0} T^{-1}\right]$ | 3) $\left[ML^{-1} T^{0}\right]$ | 4) $\left[M^{0}L^{0} T^{0}\right]$ |
| 5  | Measure of two quantities along with the precision of respective measuring instrument is A=2.5 $ms^{-1}$ $\pm $ 0.5 $ms^{-1}$ , B= 0.10 s$\pm $ 0.01 s. The value of AB will be |
|  | 1) (0.25$\pm 0.$08) m | 2) (0.25$\pm 0.$5) m | 3) (0.25$\pm 0.05$) m | 4) (0.25$\pm 0.$135) m |
| 6 | If force ‘F’, length ‘L’, and time T are taken as fundamental units, the dimensional formula for mass ‘m’ will be |
|  | 1) $\left[FL^{-1}T^{2}\right]$ | 2) $\left[FLT^{-2}\right]$ | 3) $\left[FL^{-1}T^{-1}\right]$ | 4) $\left[FL^{5}T^{-2}\right]$ |
| 7 | From the dimensional consideration, which of the following equations is correct? |
|  | 1) T=2$π\sqrt{\frac{R^{3}}{GM}}$ | 2) T=2$π\sqrt{\frac{GM}{R^{3}}}$ | 3) T=2$π\sqrt{\frac{GM}{R^{2}}}$ | 4) T=2$π\sqrt{\frac{R^{2}}{GM}}$ |
| 8 | If voltage V= (100$\pm 5$) volt and current I= (10$\pm 0.2$) A the percentage error in resistance ‘R’ is? |
|  | 1) 5.2% | 2) 25% | 3) 7% | 4) 10% |
| 9 | If the momentum of an object is increased by 10% its kinetic energy is increased by  |
|  | 1) 20% | 2) 21% | 3) 40% | 4) 19% |
| 10 | The magnetic force on a point charge is $\vec{F}=q ( \vec{v } × \vec{B} )$ here q is the electric charge, v is the velocity of point charge, B is the magnetic field . The dimensions of ‘B’ are |
|  | 1)$ \left[MLT^{-1}A\right]$  | 2) $\left[M^{2}LT^{-2}A^{-1}\right]$  | $$3) \left[MT^{-2}A^{-1}\right]$$ | 4) $\left[ML^{2}T^{-2}A^{-1}\right]$  |
| 11 | A capillary tube is attached horizontally to a constant heat arrangement. If the radius of the capillary tube is increased by 10%, then the rate of flow of liquid will change nearly by  |
|  | 1) $+$10% | 2) $+$46% | 3) -10% | 4) -40% |
| 12 | By what percentage should the pressure of a given mass of a gas be increased so as to decrease its volume by 10% at a constant temprature |
|  | 1) 5% | 2) 7.2% | 3) 12.5% | 4) 11.1% |
| 13 | A quantity is given by $X =\frac{ε\_{0} l V}{t}$, where ‘V’ is the potential differnce, ‘l’ is the length. Then ‘$X$’ has the dimensional formula same as that of  |
|  | 1) Resistance | 2) Charge | 3) Voltage | 4) Current |
| 14 | You measure two quantities as A= 1.0m$ \pm $ 0.2m, B= 2.0m$ \pm $ 0.2m. We should report correct value for $\sqrt{AB }$ as |
|  | 1) 1.4m$ \pm $ 0.4m | 2) 1.41m$ \pm $ 0.15m | 3) 1.4m$ \pm $ 0.3m | 4) 1.4m$ \pm $ 0.2m |
| 15 | If momentum ‘P’ area ‘A’ and time ‘T’ are taken to be fundamental quantities, then energy has the dimensional formula |
|  | 1) )$ \left[PA^{-1}T^{-1}\right]$  | 2) $\left[P^{2}AT\right]$ | 3) $\left[PA^{\frac{-1}{2}}T\right]$ | 4) $\left[PA^{\frac{-1}{2}}T^{-1}\right]$ |
| 16 | The equation of redox reaction is balanced either by oxidation number method or by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ method. |
|  | a) Reduction | b) Combination | c) displacement | d) Ion - electron |
| 17 | The number of water molecules in a drop of water weighing 0.018g is. |
|  | a) 6.022X1026 | b) 6.022X1023 | c) 6.022X1020 | d) 9.9X1022 |
| 18 | The equivalent mass of KMn$O\_{4}$ in alkaline medium is Mn$O\_{4}^{-}$+2$ H\_{2}$O+ 3$e^{-}$ $\rightarrow $ Mn$O\_{2}$+ 4O$H^{-}$ |
|  | a) 31.6 | b) 52.7 | c) 79 | d) none of these |
| 19 | Calculate the amount of water produced by combustion of 32g of methane$CH\_{4} \left(g\right) $+2$ O\_{2}\left(g\right) $ $\rightarrow $ $CO\_{2}\left(g\right) $+ 2$H\_{2}$O$\left(g\right)$ |
|  | a) 72g of H2O | b) 18g of H2O | c) 36 g of H2O | d) 44 g of H2O |
| 20 | The quantity of reactants and products can be expressed in terms of |
|  | a) molar | b) KJ-1 | c) $dm^{3}$ | d) volume |
| 21 | Empirical formula mass of Tartaric acid is |
|  | a) 115 | b) 50 | c) 75 | d) 100 |
| 22 | The equivalent mass of trivalent metal elements is 9geq-1 . The molar mass of its an hydrous oxide is |
|  | a) 102g | b) 27g | c) 270g | d) 78g |
| 23 | The oxidation number of oxygen in super oxide such as $KO\_{2}$ is |
|  | a) +2 | b) + $\frac{1}{2}$ | c) -2 | d) - $\frac{1}{2}$ |
| 24 | In hemoglobin the oxidation of Fe2+ ion is not possible because |
|  | a) Hydrophilic nature | b) globin protein chain |
|  | c) Hydrolytic nature | d) Hydrophobic nature |
| 25 | The organic compound present in Vinegar is  |
|  | a) HCOOH  | 2) C6H6 | c) C2H6 | d) C2H4O2 |
| 26 | The relative atomic mass of one Hydrogen atom is |
|  | a) 1.008 u | b) 1.008 gmol-1 | c) 1.008 eu | d) None of these |
| 27 | The empirical formula of caffeine C8H10N4O2is |
|  | a) C4$H\_{5}$N2O | b) C4H5N2O2 | c) CHNO | d) All of these |
| 28 | Which of following contain same number of carbon atoms as in 6g of carbon |
|  | a) 7.5gC2H6 | b) 8 g CH4 | c) both (a) an (b) | d) None of these |
| 29 | The equivalent mass of kmno4 in acidic medium is Mn$O\_{4}^{-}$ + 5$e^{-}$ $+ 8H^{+} \rightarrow $ M$n^{2+}$ + 4$H\_{2}$O |
|  | a) 79 | b) 31.6 | c) 52.7 | d) 278 |
| 30 | Carbon forms two oxides namely carbon monoxide and carbon dioxide.The equivalent mass of which element remains constant? |
|  | a) Carbon  | b) Oxygan | c)both Carbon and oxygen | d) neither Carbon nor oxygen |
| 31 | The sets A and B are any two non empty sets and over lapping,If $\left(A∪B\right)\(A∩B) $= C Then C is equal to |
|  | 1) A \ B | 2) B \ A | 3) (A \ B) $∩$ (B \ A) | 4) (A \ B) $∪ $(B \ A) |
| 32 | The set $\left\{x:x^{4}-5x^{2}+6=0, x\in R\right\}$ in the roster from is X, here X referes |
|  | 1) $\left\{\sqrt{2,}\sqrt{3}\right\}$ | 2) $\left\{-\sqrt{3,}-\sqrt{2}\right\}$ | 3)$ \left\{-\sqrt{3,}-\sqrt{2} ,\sqrt{2,}\sqrt{3}\right\}$ | 4) $\left\{-\sqrt{2,}\sqrt{2}\right\}$ |
| 33 | Let S=$\left\{x:x is a positive multiple of 3 less than 100\right\}$ and P =$ \left\{x:x is a prime number less than 20\right\}$ then n(S) + n(P) is equal to |
|  | 1) 34 | 2) 41 | 3) 33 | 4) 30 |
| 34 | If A$ ∁ B$ and A$\ne B$ then |
|  | 1) A is called a proper subset of B | 2) A is called a super set of B |
|  | 3) A is not a subset of B | 4) B is a subset of A |

35 Match the following statements in Column I with Column II and choose the

 correct option from the codes given below

|  |  |  |  |
| --- | --- | --- | --- |
| code | Column I | code | Column II |
| A |  A is a subset of B | 1 | If and only if |
| B | If $A ∁ B$ and $ B ∁ A$ then | 2 | A $∁$ B |
| C | A is not a subset of B | 3 | A = B |
| D | If a$ \in A ⟹$ a $\in B$, then | 4 |  A⍧ B |
| E | The symbol ⇔ means |

 Codes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E |
| 1 | 4 | 3 | 1 | 2 | 3 |
| 2 | 2 | 3 | 4 | 2 | 1 |
| 3 | 1 | 2 | 3 | 4 | 3 |
| 4 | 4 | 3 | 2 | 1 | 4 |

36 Two finite sets have ‘m’ and ‘n’ elements respectively the total number subsets

 of the first set is 56 More than the total number of subsets of the second set.

 Then number of element of first and Second sets are.

|  |  |  |  |
| --- | --- | --- | --- |
|  1) 7,6  |  2) 5,1 | 3) 6,3 | 4) 8,7 |

37 If A and B are the two sets then $A^{∁}$ - $B^{∁}$ = ?

|  |  |  |  |
| --- | --- | --- | --- |
|  1) B  |  2) A$∪B$ | 3) A - B | 4) B - A |

38 If A in the null set then n$\left[P \left[P\left(A\right)\right]\right]$ =?

|  |  |  |  |
| --- | --- | --- | --- |
|  1) 0  |  2) 2 | 3) 4 | 4) 8 |

39 Let A,B,C are three non-empty sets. If A ∁ B and B ∁ C then which of the following

 is true?

|  |  |  |  |
| --- | --- | --- | --- |
|  1) B – A = C - B |  2) A$∩$B$∩C=B$ | 3) A$∪B$ = B$∩C$ | 4) A$∪B$ $∪C$ = A |

40 The set X=$ ∅^{1}∩A$ : Y= $∪^{1 }∩A$, then X and Y refers to

|  |  |  |  |
| --- | --- | --- | --- |
|  1) A and $∅$ |  2) $∅ and A$ | 3) $∪and ∅$ | 4) A and $∪$ |

41. Let A and B are any two sets then $\left(A∪B\right)^{1}$ $∪$ $\left(A^{1}∩B\right)$ is equal to

|  |  |  |  |
| --- | --- | --- | --- |
|  1) $A^{1}$ |  2) $B^{1}$ | 3) $A$ | 4) B |

42. If A= $\left\{p,q,r\right\}$ then the number of proper subsets are

|  |  |  |  |
| --- | --- | --- | --- |
|  1) $8$ |  2) $7$ | 3) $6$ | 4) 5 |

43 If aN = $\left\{ax:X\in N\right\}$ then 3N$ ∩7N$ equal to

|  |  |  |  |
| --- | --- | --- | --- |
|  1) 7N |  2) 3N | 3) N | 4) 21 N |

44 Statement I: If A$ ∁ B$ $⟹$ A-B = $∅$ , A$∪B=B, and A∩B=A$

 Statement II: If A$ ∁ B$ $⟹$ C-B ⍧ C-A

|  |  |
| --- | --- |
|  1) Statement I is true |  2) Statement II true |
|  3) Both are True |  4) Both are False |

45 In a survey of 100 students 36 students like Engineering group, 37 students like

 Medicine group, 44 students like Arts group and 13 students like both

 engineering and Medicine, 11 students like Medicine and Arts 10 students like

 both Engineering and arts, 7 students like all the three groups.

 How many students did not like those three groups?

|  |  |  |  |
| --- | --- | --- | --- |
|  1) $11$ |  2) $10$ | 3) $15$ | 4) 9 |

------------------- All the Best -----------------------

ANSWER KEY

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