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Learning with the Speed of Mumbai and the Tradition of Kota

Max Marks: 60 **Date: 19.08.2022**

JB 2 MR BATCH
CHEMISTRY: DCT
Topic: Mole Concept

1. An organic compound contains 20% C, 6.66% H, 47.33% N and the rest was oxygen. Its molar mass is 120g/mol. The molecular formula of the compound is
   (a) CH_4N_2O (b) $C_2H_4NO_2$ (c) CH_3N_2O (d) $C_2H_8N_4O_2$

2. In a gaseous reaction of the type, aA + bB → cC + dD, which is wrong.
   (a) a litre of A combines with b litre of B to give C and D
   (b) a mole of A combines with b more of B to give C and D
   (c) a g of A combines with b g of B to give C and D
   (d) a molecules of A combines with b molecules of B to give C and D.

3. Volume of oxygen at STP required to burn completely 22 g of propane, C_3H_8
   (a) 22.4 L (b) 44.8 L (c) 56 L (d) 11.2 L

4. Mass of calcium carbide, CaC_2, would be needed to produce 150 g of acetylene, C_2H_2,by using excess of water?
   (a) 369.2 (b) 184.6 (c) 276.9 (d) 92.3

5. One mole of potassium chlorate is thermally decomposed and excess of aluminium is burnt in the gaseous product(Oxygen). How many mole of aluminium oxide are formed.
   (a) 1 (b) 1.5 (c) 2 (d) 3

6. 60 g of a compound on analysis gave 24 g carbon, 4 g hydrogen, 32 g oxygen. The empirical formula of the compound is
   (a) CHO (b) CH_2O (c) C_2H_2O (d) None of these

7. The volume of chlorine at STP required to liberate all the Bromine and iodine present in 1 mole of KI and 2 mole of MBr_2.
   (a) 22.4 (b) 56 (c) 44.8 (d) 33.6

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8. If 5 ml of methane is completely burnt the volume of oxygen required and the volume of CO_2 formed under the same conditions are
(a) 5 ml, 10 ml (b) 10 ml, 5 ml (c) 5 ml, 15 ml (d) 10 ml, 10 ml

9. 1 mole of C_xH_y requires 12 moles of O_2 for combustion. If molecular mass of hydrocarbon is 112g. Molecular formula of C_xH_y is
(a) C_6H_{10} (b) C_8H_{16} (c) C_8H_8 (d) C_9H_7

10. 1L of CO_2 is passed over hot coke. The volume becomes 1.4 L. the product contains:
(a) 0.6 L CO (b) 0.8 L CO_2 (c) 0.6 L CO_2 (d) 0.8 L CO

11. What is the maximum amount of $NaIO_3$ that can be produced by 12.8 g of HI

$6HI + 2HNO_3 \rightarrow 3I_2 + 2NO + 4H_2O$

$3I_2 + 6\,NaOH \rightarrow NaIO_3 + 5NaI + 3H_2O$

(a) 3.3 g (b) 33 g (c) 0.33 g (d) None

12. Weight of carbondioxide prepared by heating 200 kg of Limestone which is 95% pure.
(a) 83.6 kg (b) 167.2 kg (c) 250.8 kg (d) 125.9 kg

13. Number of moles of C formed, if 8 moles of A and 10 moles of B are allowed to react according to given equation $A + 2B \rightarrow 3C$
(a) 24 moles (b) 15 moles (c) 7.5 moles (d) 12 moles

14. When 10ml of hydrogen and 12.5 ml of chlorine are allowed to react the final mixture contains under the same conditions.
(a) 22.5 ml of HCl (b) 12.5 ml of HCl
(c) 20 ml of HCl and 2.5 ml of chlorine (d) 20 ml of HCl only

15. Reaction is $Fe_2(SO_4)_3 + BaCl_2 \rightarrow FeCl_3$

How many moles of $BaCl_2$ is needed to produce ½ mole of $FeCl_3$?

(a) $\frac{5}{2}$ moles (b) $\frac{1}{2}$ moles (c) $\frac{3}{4}$ moles (d) 2 moles

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MATHEMATICS : DCT
Topic: Trigonometry

16. If cos (A + B) = α cos A cos B + β sin A sin B, then (α, β) is

(a) (–1, –1) (b) (–1, 1) (c) (1, –1) (d) (1, 1)

17. The value of cos 105° is

(a) $\frac{\sqrt{3}+1}{2\sqrt{2}}$ (b) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ (c) $-\frac{\sqrt{3}+1}{2\sqrt{2}}$ (d) $\frac{1-\sqrt{3}}{2\sqrt{2}}$

18. cos 38° cos 8° + sin 38° sin 8° is equal to

(a) cos 30° (b) cos 60° (c) cos 45° (d) cos 38°

19. $\frac{1}{4}(\sqrt{3}\cos 23^\circ - \sin 23^\circ)$ =

(a) cos 43° (b) cos 7° (c) $\frac{1}{4}\cos 53^\circ$ (d) $\frac{1}{2}\cos 53^\circ$

20. tan 15° =

(a) $\frac{1}{3}$ (b) $\sqrt{3}-2$ (c) $2-\sqrt{3}$ (d) $2+\sqrt{3}$

21. $\frac{\cos 10^\circ + \sin 10^\circ}{\cos 10^\circ - \sin 10^\circ} =$

(a) tan 55° (b) cot 55° (c) –tan 35° (d) –cot 35°

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22. The value of tan (–945°) is

(a) –1 (b) –2 (c) –3 (d) –4

23. $\tan\theta \sin\left(\frac{\pi}{2}+\theta\right)\cos\left(\frac{\pi}{2}-\theta\right) =$

(a) 1 (b) 0 (c) $\cos^2\theta$ (d) $\sin^2\theta$

24. $\sin(\pi + \theta)\ \sin(\pi - \theta)\ \text{cosec}^2\theta =$

(a) 1 (b) –1 (c) $\sin\theta$ (d) $-\sin\theta$

25. $\dfrac{\cos(90^\circ+\theta)\sec(-\theta)\tan(180^\circ-\theta)}{\sin(360^\circ+\theta)\sec(180^\circ+\theta)\cot(90^\circ-\theta)} =$

(a) 2 (b) 1 (c) –1 (d) 0

26. $\sin 15^\circ + \cos 105^\circ =$

(a) 0 (b) $2\sin 15^\circ$ (c) $\cos 15^\circ + \sin 15^\circ$ (d) $\sin 15^\circ - \cos 15^\circ$

27. If $8\theta = \pi$, then $\cos 7\theta + \cos\theta$ is equal to

(a) 0 (b) 1 (c) –1 (d) 7

28. The value of $\dfrac{\cot 54^\circ}{\tan 36^\circ} + \dfrac{\tan 20^\circ}{\cot 70^\circ} =$

(a) 0 (b) 2 (c) 3 (d) 1

29. $\sin\left(\frac{\pi}{10}\right)\sin\left(\frac{3\pi}{10}\right) =$

(a) $\frac{1}{2}$ (b) $\frac{-1}{2}$ (c) $\frac{1}{4}$ (d) 1

30. If $\tan\frac{\theta}{2} = t$, then $\frac{1-t^2}{1+t^2}$ is equal to

(a) $\cos\theta$ (b) $\sin\theta$ (c) $\sec\theta$ (d) $\cos 2\theta$

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CHEMISTRY : DCT ANSWER KEY
Topic: Mole Concept

1.	(d)	2.	(c)	3.	(c)	4.	(a)	5.	(a)
6.	(b)	7.	(b)	8.	(b)	9.	(b)	10.	(c)
11.	(a)	12.	(a)	13.	(b)	14.	(c)	15.	(b)

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16.	(c)	17.	(d)	18.	(a)	19.	(d)	20.	(c)
21.	(a)	22.	(a)	23.	(d)	24.	(b)	25.	(c)
26.	(a)	27.	(a)	28.	(b)	29.	(c)	30.	(a)