JB 3 BATCH
CHEMISTRY: PART TEST
Topic: States of Matter + S-Block

1. A 10 g of a gas at atmospheric pressure is cooled from 273° C to 0° C keeping the volume constant, its pressure would become

    (a)   ½ atm   (b)   1/273 atm   (c)   2 atm   (d)   273 atm

2. A certain sample of gas has a volume of 0.2 litre measured at 1 atm. pressure and 0° C. At the same pressure but at 273° C, its volume will be
    (a)   0.4 litres   (b)   0.8 litres   (c)   27.8 litres   (d)   55.6 litres

3. The pressure p of a gas is plotted against its absolute temperature T for two different constant volumes, V_1 and V_2. When $V_1 > V_2$, the

    (a)   Curves have the same slope and do not intersect

    (b)   Curves must intersect at some point other than $T = 0$

    (c)   Curve for V_2 has a greater slope than that for V_1

    (d)   Curve for V_1 has a greater slope than that for V_2

4. "One gram molecule of a gas at N.T.P. occupies 22.4 litres." This fact was derived from

    (a)   Dalton's theory   (b)   Avogadro's hypothesis

    (c)   Berzelius hypothesis   (d)   Law of gaseous volume

5. Which one of the following statements is false

    (a)   Avogadro number $= 6.02 \times 10^{21}$

    (b)   The relationship between average velocity ($\overline{v}$) and root mean square velocity (u) is $\overline{v} = 09213u$

    (c)   The mean kinetic energy of an ideal gas is independent of the pressure of the gas.

    (d)   The root mean square velocity of the gas can be calculated by the formula $(3 RT/ M)^{1/2}$

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6. In the equation of sate of an ideal gas PV = nRT , the value of the universal gas constant would depend only on

(a) The nature of the gas

(b) The pressure of the gas

(c) The units of the measurement

(d) None of these

7. In the equation PV = nRT, which one cannot be the numerical value of R

(a) 8.31×10^7 erg K^{-1} mol^{-1}

(b) 8.31×10^7 dyne cm K^{-1} mol^{-1}

(c) 8.31 JK^{-1} mol^{-1}

(d) 8.31 atm. K^{-1} mol^{-1}

8. The constant R is

(a) Work done per molecule

(b) Work done per degree absolute

(c) Work done per degree per mole

(d) Work done per mole

9. The correct value of the gas constant R is close to

(a) 0.082 litre - atmopshere K

(b) 0.082 litre-atmosphere K^{-1} mol^{-1}

(c) 0.082 litre-atmosphere $^{-1}$ K mol^{-1}

(d) 0.082 litre^{-1} atmosphere^{-1} K mol

10. Gas equation PV = nRT is obeyed by

(a) Only isothermal process

(b) Only adiabatic process

(c) Both (a) and (b)

(d) None of these

11. If two moles of an ideal gas at 546 K occupy a volume of 44.8 litres, the pressure must be

(a) 2 atm (b) 3 atm (c) 4 atm (d) 1 atm

12. Volume of 0.5 mole of a gas at 1 atm. Pressure and 273 K is

(a) 22.4 litres (b) 11.2 litres (c) 44.8 litres (d) 5.6 litres

13. Correct gas equation is

(a) $\dfrac{V_1 T_2}{P_1} = \dfrac{V_2 T_1}{P_2}$

(b) $\dfrac{P_1 V_1}{P_2 V_2} = \dfrac{T_1}{T_2}$

(c) $\dfrac{P_1 T_2}{V_1} = \dfrac{P_2 V_2}{T_2}$

(d) $\dfrac{V_1 V_2}{T_1 T_2} = P_1 P_2$

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14. The chemical nature of hydrogen peroxide is :

    (a) Oxidising and reducing agent in acidic medium, but not in basic medium.

    (b) Oxidising and reducing agent in both acidic and basic medium

    (c) Reducing agent in basic medium, but not in acidic medium

    (d) Oxidising agent in acidic medium, but not in basic medium

15. The strength of 11.2 volume solution of H_2O_2 is : [Given that molar mass of H = 1 g mol^{-1} and O = 16 g mol^{-1}]

    (a) 13.6%   (b) 3.4%   (c) 34%   (d) 1.7%

16. The hydride that is not electron deficient is

    (a) B_2H_6 (b) AlH_3 (c) SiH_4 (d) GaH_3

17. The temporary hardness of a water sample is due to compound X. Boiling this sample converts X to compound Y. X and Y, respectively, are

    (a) $Ca(HCO_3)$ and CaO (b) $Mg(HCO_3)_2$ and $MgCO_3$

    (c) $Mg(HCO_3)_2$ and $Mg(OH)_2$ (d) $Ca(HCO_3)_2$ and $Ca(OH)_2$

18. The number of water molecule(s) not coordinated to copper ion directly in $CuSO_4. 5H_2O$, is:

    (a) 4   (b) 3   (c) 1   (d) 2

19. Hydrogen molecule differs from chlorine molecule in which of the following respect?

    (a) Hydrogen molecule is non-polar but chlorine molecule is polar

    (b) Hydrogen molecule is polar while chlorine molecule is non-polar

    (c) Hydrogen molecule can form intermolecular hydrogen bonds but chlorine molecule does not

    (d) Hydrogen molecule cannot participate in coordination bond formation but chlorine molecule can

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20. Hydrogen peroxide is reduced by

    (a) Lead sulphide suspension   (b) Barium peroxide

    (c) Acidic solution of $KMnO_4$ (d) Ozone

21. Temporary hardness of water can be removed by

    (a) Addition of potassium permagenate   (b) Boiling

    (c) Filtration   (d) Addition of chlorine

22. The metal which displaces hydrogen from a boiling caustic soda solution is

    (a) As   (b) Zn   (c) Mg   (d) Fe

23. Metals like platinum and palladium can absorb large volumes of hydrogen under special conditions. Such absorbed hydrogen by the metal is known as

    (a) Adsorbed hydrogen   (b) Occuluded hydrogen

    (c) Reactive hydrogen   (d) Atomic hydrogen

24. Ortho and para hydrogen differ in

    (a) Proton spin   (b) Electron spin   (c) Nuclear charge   (d) Nuclear reaction

25. Hydrogen from HCl can be prepared by

    (a) Mg   (b) Cu   (c) P   (d) Pt.

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MATHEMATICS : PART TEST
Topic: Trigonometry

26. $\cot \dfrac{\pi}{20} . \cos \dfrac{3\pi}{20} . \cot \dfrac{5\pi}{20} . \cot \dfrac{7\pi}{20} . \cot \dfrac{9\pi}{20} = $ ….

   (a) -1 (b) 0 (c) 1 (d) None of these

27. A horse is tied to a post by a rope. If the horse moves along a circular path, always keeping the rope tight and describes 88 meter when it traces the angle of $72°$ at the centre, then the length of the rope is

   (a) 70 m   (b) 55 m   (c) 40 m   (d) 35 m

28. If α is a root of $25 \cos^2 \theta + 5 \cos \theta - 12 = 0$, $\dfrac{\pi}{2} < \alpha < \pi$ then $\sin 2\alpha$ is equal to:

   (a) $-\dfrac{24}{25}$ (b) $-\dfrac{13}{18}$ (c) $\dfrac{13}{18}$ (d) $\dfrac{24}{25}$

29. If $0 < A < (\pi/2)$ and $0 < B < (\pi/2)$, then angle $(A - B)$ lies in … quadrant

   (a) First   (b) Second   (c) Third   (d) Fourth

30. For any angles A, B, C $\dfrac{\sin(A - B)}{\cos A . \cos B} + \dfrac{\sin(B - C)}{\cos B . \cos C} + \dfrac{\sin(C - A)}{\cos C . \cos A} = $

   (a) 0   (b) $\sin(A - B - C)$ (c) $\tan(A - B - C)$ (d) None of these

31. If $\sin (x - 60°) = 2 . \cos (x - 30°)$, then : $\tan x = $ ….

   (a) $\sqrt{3}$ (b) $3\sqrt{3}$ (c) $-\sqrt{3}$ (d) $-3\sqrt{3}$

32. If $x^o = \left(\dfrac{13\pi}{6}\right)^c$, then : $x = $

   (a) $390°$ (b) $930°$ (c) $309°$ (d) $390°$

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33. The sin θ + cosec θ = 2, then : $\sin^2 \theta + \csc^2 \theta$ =

   (a)   1   (b)   4   (c)   2   (d)   8

34. $\cos \dfrac{\pi}{12} + \cot \dfrac{3\pi}{12} + \cos \dfrac{9\pi}{12} + \cos \dfrac{11\pi}{12}$ = ...

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

35. If a 14 cm long pendulum oscillates through an angle of 12°, then find the length of its path.

   (a) $\dfrac{13\pi}{14}$ (b) $\dfrac{14\pi}{13}$ (c) $\dfrac{15\pi}{14}$ (d) $\dfrac{14\pi}{15}$

36. If $\theta = 60°$, then $\dfrac{1 + \tan^2 \theta}{2 \tan \theta}$ is equal to

   (a) $\dfrac{\sqrt{3}}{2}$ (b) $\dfrac{2}{\sqrt{3}}$ (c) $\dfrac{1}{\sqrt{3}}$ (d) $\sqrt{3}$

37. If $0 < A < (\pi/2)$ and $0 < B < (\pi/2)$, then angle $(A + B)$ lies in … quadrant

   (a)   First   (b)   Second   (c)   Third   (d)   Fourth

38. $\sin x + \cos x = \sqrt{2} \cdot \sin (.....)$

   (a) $x - \dfrac{\pi}{4}$ (b) $\dfrac{\pi}{4} - x$ (c) $x + \dfrac{\pi}{4}$ (d) $x - \dfrac{\pi}{2}$

39. $\dfrac{\cos 54°}{\tan 36°} + \dfrac{\tan 20°}{\cot 70°}$ = ...

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

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40.   If $y^c = 27°$, then : y =

(a) $\left(\dfrac{20\pi}{3}\right)^c$ (b) $\dfrac{20\pi}{3}$ (c) $\dfrac{3\pi}{20}$ (d) $\dfrac{\pi}{20}$

41. $\tan 20° + \tan 40° + \sqrt{3} \cdot \tan 20° \cdot \tan 40° =$

(a) $\dfrac{\sqrt{3}}{4}$ (b) $\dfrac{\sqrt{3}}{2}$ (c) $\sqrt{3}$ (d)   1

42. $\sin^2 \dfrac{\pi}{8} + \sin^2 \dfrac{3\pi}{8} + \sin^2 \dfrac{5\pi}{8} + \sin^2 \dfrac{7\pi}{8} = \dots.$

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

43.   Angle between hands of a clock when it shows the time 9.45 is

(a) $(7.5)°$ (b) $(12.5)°$ (c) $(17.5)°$ (d) $(22.5)°$

44.   If $\sec \theta = m$ and $\tan \theta = n$, then

$\dfrac{1}{m}\left\{(m + n) + \dfrac{1}{(m + n)}\right\}$ is equal to

(a)   2   (b)   mn   (c)   2m   (d)   2n

45.   If $\sin A = 3/5$ and $\cos B = 9/41$, where A, B are both in the first quadrant, then : $\sin (A - B) =$

(a)   – 133/205   (b)   –84/205   (c)   124/205   (d)   None of these

46. $\cos x - \sin x = \sqrt{2} \cdot \cos (\dots)$

(a) $x - \dfrac{\pi}{4}$ (b) $\dfrac{\pi}{2} - x$ (c) $x + \dfrac{\pi}{4}$ (d)   None of these

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47. $\cos^2\left(\dfrac{\pi}{4} - \theta\right) + \cos^2\left(\dfrac{\pi}{4} + \theta\right) = \ldots$

(a) 1 (b) 2 (c) 3 (d) None of these

48. In a right-angled triangle, if one angle has measure $75°$, then another angle has measure

(a) $105°$ (b) $\left(\dfrac{\pi}{12}\right)^{c}$ (c) $30°$ (d) $\left(\dfrac{\pi}{10}\right)^{c}$

49. The value of $\sin 200° + \cos 200°$ is

(a) positive (b) negative (c) zero (d) non-negative

50. If $\operatorname{cosec}\theta + \cot\theta = \dfrac{11}{2}$, then : $\tan\theta =$

(a) $\dfrac{21}{22}$ (b) $\dfrac{15}{16}$ (c) $\dfrac{44}{117}$ (d) $\dfrac{22}{21}$

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JB 3 MR BATCH
CHEMISTRY: PART TEST ANSWER KEY
Topic: States of Matter + S - Block

1.	(a)	2.	(a)	3.	(c)	4.	(b)	5.	(a)
6.	(c)	7.	(d)	8.	(c)	9.	(b)	10.	(c)
11.	(a)	12.	(b)	13.	(b)	14.	(b)	15.	(b)
16.	(c)	17.	(b)	18.	(c)	19.	(d)	20.	(a)
21.	(b)	22.	(b)	23.	(a)	24.	(a)	25.	(a)

MATHEMATICS : PART TEST ANSWER KEY
Topic: Trigonometry

26.	(c)	27.	(a)	28.	(a)	29.	(d)	30.	(a)
31.	(d)	32.	(d)	33.	(c)	34.	(b)	35.	(d)
36.	(b)	37.	(b)	38.	(c)	39.	(b)	40.	(c)
41.	(c)	42.	(b)	43.	(d)	44.	(a)	45.	(a)
46.	(c)	47.	(a)	48.	(b)	49.	(b)	50.	(c)