MHT CET 2026 Mathematics Memory Based Question Paper PDF

Chemistry

1. The rate of reaction A $\rightarrow$ P is 1.25×10^{-2} mol dm^{-3} s^{-1} when [A] = 0.5 M. Calculate the rate constant if the reaction is second order in A.

   (a) 0.05
   (b) 0.04
   (c) 0.03
   (d) 0.01

2. Which of the following is a correct set of four quantum numbers for 4*d* orbital?

   (a) $(4, 3, 2, +1/2)$
   (b) $(4, 2, 1, +1/2)$
   (c) $(4, 1, 2, +1/2)$
   (d) None of these

3. Identify unit of rate constant for first order reaction from the following.

   (a) mol dm^{-3} s^{-1}
   (b) s^{-1}
   (c) mol^{-1} dm^3 s^{-1}
   (d) mol dm^{-3}

4. Which of the following mixtures of gases represent water gas?

   (a) $CO + H_2$
   (b) $CO_2 + H_2$
   (c) $H_2O + CH_4$
   (d) $H_2 + O_2$

5. Which of the following electrolytic solutions of the same electrolyte has Maximum electrolytic conductivity at the same temp?

   (a) 0.2 mole of solute is dissolved in 250 ml
   (b) 0.3 mol in 600 ml
   (c) 0.6 in 1000 ml
   (d) 0.8 mole in 2000 ml

Mathematics

6. If $\sin x \cos x = \frac{1}{4}$, then the general solution is:
   (a) $x = \frac{n\pi}{2} + (-1)^n \frac{\pi}{12}$
   (b) $x = n\pi + (-1)^n \frac{\pi}{12}$
   (c) $x = \frac{n\pi}{2} + (-1)^n \frac{\pi}{6}$
   (d) $x = n\pi + (-1)^n \frac{\pi}{6}$

7. If $n \in \mathbb{Z}$, then the expression $\frac{2^n}{(1-i)^{2n}} + \frac{(1+i)^{2n}}{2^n}$ is equal to:
   (a) $2i^n$
   (b) 0
   (c) 2^{n+1}
   (d) i^n

8. The value of $\int \frac{x^2-1}{(x^4+3x^2+1)\tan^{-1}\left(x+\frac{1}{x}\right)}\,dx$ is:
   (a) $\ln\left|\tan^{-1}(x+1/x)\right| + C$
   (b) $\tan^{-1}(x+1/x) + C$
   (c) $\frac{1}{2}\left(\tan^{-1}(x+1/x)\right)^2 + C$
   (d) $\ln|x^4+3x^2+1| + C$

9. If $A = \begin{bmatrix} \sin\alpha & -\cos\alpha \\ \cos\alpha & \sin\alpha \end{bmatrix}$ and $\alpha \in \left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$. If $A + A^T = I$, then $\alpha =$
   (a) $\frac{2\pi}{3}$
   (b) $\frac{5\pi}{6}$
   (c) π
   (d) $\frac{4\pi}{3}$

10. The parametric equations of the circle $x^2 + y^2 - 4x - 6y - 12 = 0$ are:
    (a) $x = 2 + 5\cos\theta,\ y = 3 + 5\sin\theta$
    (b) $x = -2 + 5\cos\theta,\ y = -3 + 5\sin\theta$
    (c) $x = 2 + 25\cos\theta,\ y = 3 + 25\sin\theta$
    (d) $x = 5 + 2\cos\theta,\ y = 5 + 3\sin\theta$

Physics

11. If the absolute temperature of a black body is doubled, the frequency corresponding to maximum emissive power becomes:
    (a) halved
    (b) doubled
    (c) four times
    (d) unchanged

12. The ratio of specific heats C_p/C_v for a mixture of 1 mole of helium and 1 mole of hydrogen is:
    (a) 1.5

(b) 1.67

(c) 1.4

(d) 1.33

13. In an isothermal expansion of an ideal gas, the heat supplied to the gas is:

(a) entirely used to increase internal energy

(b) entirely used to do work

(c) partly used to do work and partly used to increase internal energy

(d) none of the above

14. A refrigerator has a coefficient of performance of 5. If the temperature inside the freezer is $-20°C$, the temperature of the surroundings to which it rejects heat is:

(a) $31°C$

(b) $41°C$

(c) $21°C$

(d) $11°C$

15. The displacement of a particle executing SHM is given by $x = 0.01\sin(100\pi t + 0.05)$. Its maximum velocity is:

(a) π m/s

(b) 10π m/s

(c) 0.1π m/s

(d) 100π m/s