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MHT CET 2025 21 April Shift 1 Question Paper

Time Allowed :3 Hour	Maximum Marks :200	Total Questions :150

1. If $a(4+x^2)=x+y-x^3=a^3\frac{dy}{dx}$ at $x=1$, then the value of $\frac{dy}{dx}$ is:

(A) 5

(B) 4

(C) 3

(D) 2

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2. Evaluate the definite integral:

$$\int_0^{\frac{\pi}{2}} \frac{dx}{1+(\cot x)^{101}} = ?$$

(A) $\frac{\pi}{4}$

(B) $\frac{\pi}{2}$

(C) $\frac{1}{2}$

(D) 1

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3. For all real x, the minimum value of the function $f(x)=\frac{1-x+x^2}{1+x+x^2}$ is:

(A) $\frac{1}{3}$

(B) 0

(C) 3

(D) 1

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4. If $a(u+x^2)=x$ and $y-x^3=a^2$, then $\frac{dy}{dx}$ at $x=1$ is:

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5. Approximate value of $\cos 59^\circ$ is:

(A) 0.50

(B) 0.61

(C) 0.75

(D) 0.85

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6. Evaluate the integral: $\int \log((2+x)^{2+x})\,dx$

(A) $(2+x)^{2+x}+C$

(B) $(2+x)\log((2+x)^{2+x})+C$

(C) $(2+x)\cdot(2+x)^{x}+C$

(D) $(2+x)(2+x)^{x}(\log(2+x)+1)+C$

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7. If $x^y+y^x=a^b$**, then** $\frac{dy}{dx}$ **at** $x=1, y=2$ **is:**

(A) -1

(B) 1

(C) 2

(D) $\frac{1}{2}$

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8. What is the correct order of thermal stability of the following carbonates?

$BaCO_3$, $MgCO_3$, $SrCO_3$, $CaCO_3$

(A) $MgCO_3 < CaCO_3 < SrCO_3 < BaCO_3$

(B) $BaCO_3 < SrCO_3 < CaCO_3 < MgCO_3$

(C) $BaCO_3 > MgCO_3 > SrCO_3 > CaCO_3$

(D) $MgCO_3 > CaCO_3 > SrCO_3 > BaCO_3$

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9. Which of the following plots gives a straight line for a zero-order reaction?

(A) $[A]$ vs t

(B) $\log[A]$ vs t

(C) $1/[A]$ vs t

(D) $\ln[A]$ vs t

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11. For a first-order reaction, the slope of the graph between $\log[A]$ **vs time is equal to:**

(A) $-\frac{k}{2.303}$

(B) k

(C) $2.303k$

(D) $-2.303k$

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12. The magnetic moment of Mn^{3+} is:

(A) $1.73\,\text{BM}$

(B) $2.83\,\text{BM}$

(C) $4.90\,\text{BM}$

(D) $5.92\,\text{BM}$

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13. Which trend is correct regarding ionic radius in the 4f-series (lanthanides)?

(A) Radius increases from La^{3+} to Lu^{3+}

(B) Radius remains same

(C) Radius decreases across the series

(D) No regular trend observed

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14. Which of the following d-block elements has the highest melting point?

(A) Zn

(B) Fe

(C) Cr

(D) W

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15. At a given temperature, which of the following statements is correct regarding the solubility of a solid in a liquid?

(A) It always increases with increase in temperature.

(B) It always decreases with increase in temperature.

(C) It may increase or decrease depending on the enthalpy change.

(D) It does not depend on temperature.

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16. Which of the following is a primary alcohol?

(A) $CH_3CH_2CH_2OH$

(B) $(CH_3)_2CHOH$

(C) $(CH_3)_3COH$

(D) None of these

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17. Which of the following monomers undergo addition polymerization?

(A) Ethene

(B) Acetic acid

(C) Glucose

(D) Glycerol

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18. Which of the following is the polymer formed from acrylonitrile?

(A) Polyvinyl chloride (PVC)

(B) Polyacrylonitrile (PAN)

(C) Teflon

(D) Nylon-6

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19. Thermal stability order of Group 1 hydroxides is:

(A) LiOH < NaOH < KOH < RbOH < CsOH

(B) CsOH < RbOH < KOH < NaOH < LiOH

(C) LiOH > NaOH > KOH > RbOH > CsOH

(D) LiOH = NaOH = KOH = CsOH

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20. Which of the following is not a transition metal?

(A) Zn

(B) Fe

(C) Cr

(D) Cu
