**7245**

**BOARD DIPLOMA EXAMINATION, (C-20)**

**NOVEMBER/DECEMBER—2022**

**DEEE – THIRD SEMESTER EXAMINATION**

ENGINEERING  MATHEMATICS—II

*Time* : 3 hours ]                                    [ *Total Marks* : 80

**PART—A**                                3×10=30

**Instructions :** (1)   Answer **all** questions.

(2)   Each question carries **three** marks.

**1.**   Evaluate $\int \left( 5^x + 5x + \dfrac{5}{x} \right) dx$

**2.**   Evaluate $\int \sqrt{1 + \sin 2x}\, dx$

**3.**   Evaluate $\int \dfrac{\sin(\log x)}{x}\, dx$

\*  **4.**   Evaluate $\int x \log x\, dx$

**5.**   Evaluate $\int_0^1 \dfrac{1}{\sqrt{1 - x^2}}\, dx$

**6.**   Find the mean value of $y = x^2 - 3x + 2$ between the limits $x = 1$ and $x = 2$.

**7.**   Find the area bounded by the curve $y = x^2 + 3x$ and *x*-axis.

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**8.** Form differential equation by eliminating the arbitrary constants $A$ and $B$ from the equation $y = Ae^{2x} + Be^{-2x}$.

**9.** Solve $\dfrac{dy}{dx} = \sqrt{\dfrac{1-y^2}{1-x^2}}$

**10.** Solve $\dfrac{dy}{dx} + 2y = e^{-x}$

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**PART—B**　　　　　　　　8×5=40

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**Instructions :**　(1) Answer **all** questions.

　　　　　　　　　(2) Each question carries **eight** marks.

**11.** Evaluate $\displaystyle \int \dfrac{1}{5+4\cos x}\,dx$

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**(OR)**

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Evaluate $\displaystyle \int \dfrac{x}{x^2+8x+12}\,dx$

**12.** Evaluate $\displaystyle \int \tan^{-1}\left[\dfrac{3x-x^3}{1-3x^2}\right]dx$

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**(OR)**

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Evaluate $\displaystyle \int x^3 e^{2x}\,dx$

**13.** Evaluate $\displaystyle \int_0^{\frac{\pi}{2}} \dfrac{\sin^3 x}{\sin^3 x + \cos^3 x}\,dx$

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**(OR)**

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Evaluate $\displaystyle \int_0^{\frac{\pi}{2}} \sin 5x \cos 3x\,dx$

**14.** Find the R.M.S. value of $x^{e^x}$ over the range $x = 0$ to $x = 1$.

**(OR)**

Find the area of the circle $x^2 + y^2 = a^2$ using integration.

**15.** Find the approximate value of $\int_1^5 \dfrac{1}{1+x}\,dx$ using trapezoidal rule by dividing [1,5] into four equal parts.

**(OR)**

Find the volume of the solid generated by revolving the area bounded by the curve $y = x^3$, the $y$-axis and the lines $y = 0$, $y = 8$ about the $y$-axis.

## PART—C

10×1=10

**Instructions :**   (1) Answer the following question.

(2) The question carries **ten** marks.

**16.** Solve $x^2 y\,dx = (x^3 + y^3)\,dy$

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