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C16-EC-301/C16-CHPC-301**6232**

**BOARD DIPLOMA EXAMINATION, (C-16)
OCT/NOV—2018
DECE—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.
(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Evaluate $x^3 - 3^x - \frac{3}{x} dx$.

2. Evaluate $x \sin x^2 dx$.

3. Evaluate $\int_0^{\pi} \sin x dx$.

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

5. Find $L \lim_{t \rightarrow \infty} (\sin 2t - t^2 + 5e^{-3t})$

6. Find $L^{-1} \left[\frac{2}{x-3} - \frac{1}{s} - \frac{s}{s^2-4} \right]$.
7. Write the Euler's formulae to find a_0, a_n, b_n if a function $f(x)$ is expanded in a Fourier series in the interval $(0, 2\pi)$.
8. Find the differential equation of the family of parabolas $y^2 = 4ax$ where a is an arbitrary constant.
9. Solve $\frac{dy}{dx} = x^2y^2$.
10. Solve $(D^2 - 2D + 1)y = 0$.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

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

(3) The answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Evaluate $\int \frac{1}{x^2 - 2x + 5} dx$

(b) Evaluate $\int x \log x dx$.

12. (a) Evaluate $\int \frac{e^x - x + 2}{x - 3} dx$

(b) Prove that $\int_0^{\pi/2} \frac{\cos x}{\cos x + \sin x} dx = \frac{\pi}{4}$.

13. (a) Find the RMS value of $f(x) = 3\sqrt{16 - x^2}$ from $x = -3$ to $x = 2$.

(b) Find the volume of the solid obtained by revolving the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ about x -axis.

- 14.** (a) Find the approximate value of $\int_0^1 \frac{1}{x^2} dx$ using Trapezoidal rule by dividing the interval [0.1] into 5 equal parts.
- (b) Find $L^{-1} t \cos 3t$.
- 15.** (a) Find $L^{-1} \frac{s^2}{s^2 - 5s + 6}$
- (b) Find $L^{-1} \frac{1}{(s-1)(s-3)}$ using convolution theorem.
- 16.** Obtain the half-range cosine and sine series for $f(x) = x$ in the interval $(0, \pi)$.
- 17.** (a) solve $\frac{dy}{dx} = \frac{y}{x} \operatorname{cosec} \frac{y}{x}$
- (b) Solve $\frac{dy}{dx} = y \cot x - \cos x$
- 18.** (a) Solve $(D^2 - 2D - 8)y = e^{3x} - e^{2x}$
- (b) Solve $(D^2 - 3D - 2)y = \sin 3x$

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