



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 $x^3 - 3x + \frac{3}{x} dx$.

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 $L \int \sin 2t - t^2 + 5e^{3t}$

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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 $x = 3$.

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

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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 $L^{-1} \frac{1}{s-1} \frac{1}{s-3}$ using convolution theorem.

16. Obtain the half-range cosine and sine series for $f(x) = x$ in the interval $(0, \pi)$.

17. (a) solve $\frac{dy}{dx} + \frac{y}{x} = \csc \frac{y}{x}$

(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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