



C16-C-301/C16-CM-301/C16-IT-301

6222

BOARD DIPLOMA EXAMINATION, (C-16)

OCT/NOV—2018

DCE—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 $\int \sqrt{1 - \sin 2x} \, dx$.

2. Evaluate $\int \frac{\cos \log x}{x} \, dx$.

3. Evaluate $\int_0^{\frac{\pi}{2}} \sin^2 x \, dx$.

4. Find the RMS value of $\sqrt{27 - x^2}$ over the interval (0, 3).

5. Find $L(t^2 - 1)^2$.

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6. Find $L^{-1} \frac{2s-5}{(s-2)^2-4}$.
7. Find a_0 in the Fourier series expansion of $F(x) = e^x$ in the interval $(-\pi, \pi)$.
8. Solve $(e^x - 1) \sin y \, dy + e^x \cos y \, dx = 0$.
9. Solve $(D^2 - 3D - 5)y = 0$.
10. Form differential equation for the family of curves $y = Ae^{2x} + Be^{-2x}$.

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 $\int \sin 5x \cos 7x \, dx$.

(b) Evaluate $\int \frac{1}{5 - 4 \cos x} \, dx$.

12. (a) Evaluate $\int x^3 e^{5x} \, dx$.

(b) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin^{12} x}{\sin^{12} x + \cos^{12} x} \, dx$.

13. (a) Find the area bounded between the parabolas $y^2 = 16x$ and $x^2 = 16y$.

(b) Find the volume of the solid generated when the region of the circle $x^2 + y^2 = 16$ is revolved about a diameter.

- * **14.** (a) A curve is drawn to pass through the points given by the following table :

x	1	1.5	2	2.5	3	3.5	4
y	3	3.4	3.7	2.8	2.7	2.6	2.1

Calculate the area bounded by the curve, x -axis and the lines $x = 1$ and $x = 4$ using trapezoidal rule.

(b) Find $L\{t e^{2t} \sin 3t\}$.

15. (a) Find $L \frac{e^{2t} - e^{3t}}{t}$.

(b) Find $L^{-1} \frac{s}{s^2 - 2}$.

- 16.** Obtain the Fourier half range Cosine series and Sine series for $f(x) = x$ in the interval $(0, \pi)$.

17. (a) Solve $x \frac{dy}{dx} - 2y = x^2 \log x$.

(b) Solve $(x^2 + y^2 + a^2)x dx + (x^2 + y^2 + b^2)y dy = 0$.

18. (a) Solve $(D^2 - 3D - 2)y = \cos 3x$, where $D = \frac{d}{dx}$.

(b) Solve $(D^2 - 3D - 2)y = x^2$, where $D = \frac{d}{dx}$.
