



c16-c-301

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BOARD DIPLOMA EXAMINATION, (C-16)
MARCH/APRIL—2018
DCE—THIRD SEMESTER EXAMINATION
ENGINEERING MATHEMATICS—III

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

- Instructions** : (1) Answer **all** questions.
(2) Each question carries **three** marks.

1. Evaluate :

$$e^x \int 2 \sin x \frac{6}{\sqrt{1-x^2}} dx$$

2. Evaluate :

$$\int \sqrt{1-\cos 2x} dx$$

3. Evaluate :

$$\int \frac{\cos(\tan^{-1} x)}{1-x^2} dx$$

4. Evaluate :

$$\int \sqrt{100-x^2} dx$$

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5. Evaluate :

$$\int_1^1 (2x^2 - 3x + 5) dx$$

6. Find the area bounded by the parabola $y = x^2$, x-axis, between the lines $x = 2$ and $x = 3$.

7. Find the differential equation of the family of curves $y = Ae^x + Be^{-x}$.

8. Solve :

$$\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{\sqrt{1-x^2}}$$

9. Show that $(e^y - 1)\cos x dx + e^y \sin x dy = 0$ is an exact differential equation.

10. Find the integrating factor of

$$\frac{dy}{dx} + y \cot x = \operatorname{cosec} x$$

PART—B

10×5=50

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

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

11. (a) Evaluate :

$$\int \cos(7x)\cos(2x) dx$$

(b) Evaluate :

$$\int \frac{1}{\sqrt{x^2 - 6x + 25}} dx$$

12. (a) Evaluate :

$$\int \frac{x}{(x-1)(x-3)} dx$$

(b) Evaluate :

$$\int x^3 e^{-x} dx$$

13. (a) Evaluate :

$$\int_0^{1/2} \frac{\sqrt{\tan x}}{\sqrt{\tan x} \sqrt{\cot x}} dx$$

(b) Evaluate :

$$\int_0^{1/2} x \cos x dx$$

14. (a) Find the mean value of $x^2 - 5x + 6$ between the values of x where the expression vanishes.

(b) Find the volume generated by revolution of ellipse $9x^2 + 25y^2 = 225$ about x -axis.

15. (a) Find the r.m.s. value of $\sqrt{\log x}$ over the range $x = 1$ to $x = e$.

(b) Evaluate $\int_1^9 x^2 dx$ using trapezoidal rule when $n = 4$.

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16. (a) Calculate the approximate value of $\int_3^3 x^4 dx$ using Simpson's rule by taking $n = 6$.

(b) Solve $\sec^2 x \tan y dx - \sec^2 y \tan x dy = 0$.

17. Solve $xy^2 dy - (x^3 - y^3) dx = 0$.

18. (a) Solve $(\cos x - x \cos y) dy - (\sin y - y \sin x) dx = 0$.

(b) Solve $(1 - x^2) \frac{dy}{dx} = 2xy - x^3$.
