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C16–M–301/C16–CHOT–301/C16–RAC–**301**

6242

BOARD DIPLOMA EXAMINATION, (C–16)

MARCH/APRIL—2018

DME—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 :

$$\frac{e^{\cos^{-1} x}}{\sqrt{1 - x^2}}\,dx$$

2. Evaluate :

$$\frac{3x^2 - 2x}{x^3 - x^2 - 7}\,dx$$

3. Evaluate :

$$\int_0^{\sqrt{3}} \frac{dx}{1 + x^2}$$

4. Find the mean value of $y^2 = \frac{1}{x}$ from $x = 1$ to $x = 3$.

5. Find $L(t^3 e^{5t})$.

6. Find the inverse Laplace transform of $\frac{3}{s^2 \quad 4} \quad \frac{1}{s \quad 5} \quad \frac{5}{s^2 \quad 4}$.

7. Find the Fourier coefficient b_1 for the function $f(x) \quad x$ in the interval $(0, 2 \ )$.

8. Solve :

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

9. Find the particular integral of $(D^2 \quad 4)y \quad e^{2x}$.

10. Find the differential equation from $y \quad ae^{9x} \quad be^{9x}$ by eliminating a and b.

PART—B

10×5=50

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

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

11. *(a)* Evaluate :

$$\sqrt{x^2 \quad 2x \quad 3}\, dx$$

(b) Evaluate :

$$\frac{1}{5 \quad 4\sin x}\, dx$$

12. *(a)* Integrate $x \tan^{1} x$ w.r.t. x.

(b) Evaluate :

$$\int_0^{/2} \frac{\cos^3 x}{\sin^3 x \quad \cos^3 x}\, dx$$

13. *(a)* Find the area of the region bounded by the curve $y \quad 3x^2$, x-axis and the line $x \quad 3$.

(b) Find the volume of the solid generated by revolving the area bounded by the ellipse $16x^2 \quad 25y^2 \quad 400$ about its minor axis.

14. *(a)* Evaluate :

$$\int_{1}^{11} x^3 \, dx$$

using trapezoidal rule by taking $n = 10$

(b) Find $L\{e^{-3t} \sin 4t \cos 3t\}$.

15. *(a)* Find :

$$L^{-1}\left\{\frac{1}{(s^2 + 5s + 6)}\right\}$$

(b) Find :

$$L^{-1}\left\{\frac{1}{(s+1)(s+2)}\right\}$$

by using convolution theorem.

16. Expand the function $f(x) = x^2$ as a Fourier series in $(0, 2\pi)$.

17. *(a)* Solve :

$$\frac{dy}{dx} + y \tan x = \cos x$$

(b) Solve :

$$(3x + y + 1)dx + (5y + x + 3)dy = 0$$

18. *(a)* Solve :

$$(D^2 + 3D + 2)y = e^{2x}$$

(b) Solve :

$$(D^2 + 25)y = \sin 5x$$

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