



C16-COMMON-301

6201

BOARD DIPLOMA EXAMINATION, (C-16)

JANUARY/FEBRUARY—2022

THIRD SEMESTER (COMMON) 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 : $\int \left(\frac{x}{a} + \frac{b}{x} \right) dx$

2. Evaluate : $\int (\sqrt{x} + \sin 2x + e^{-x}) dx$

3. Evaluate : $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$

4. Find the area bounded by the parabola $y = x^2 + 1$ from $x = 0$ to $x = 1$.

5. Find $L(3e^{-t} + \cos 2t)$.

6. Find $\int_1^2 \left(x^2 + \frac{1}{x^2} \right) dx$.

7. Find the Fourier coefficient a_0 for $f(x) = k$ in $0 < x < 2\pi$.
8. Find the differential equation to the family of curves $y = mx + 1$, where m is arbitrary constant.
9. Solve : $(x+1)dy + (y+1)dx = 0$
10. Solve : $(D^2 - D - 12)y = 0$

PART—B

10×5=50

- Instructions :** (1) Answer *any five* questions.
 (2) Each question carries **ten** marks.

11. (a) Evaluate : $\int \sin 3x \cos 2x dx$

(b) Evaluate : $\int \sec^2 x e^{\tan x} dx$

12. (a) Evaluate : $\int \left(3x^2 + \cosh 2x + \frac{2}{x} + \sqrt{2x} \right) dx$

(b) Evaluate : $\int_0^1 \frac{1}{(x+1)(x+2)} dx$

13. (a) Evaluate : $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$

(b) Find the mean value of $x^2 - 3x + 2$ between the lines $x = 1$ and $x = 2$.

14. Evaluate $\int_1^{11} x^3 dx$ using Simpson's rule by taking $n = 10$.

15. ^{*} (a) Evaluate $L(at^2 + bt + c \sinh 2t + d \cosh 3t)$, where a , b , c and d are all constants.

(b) Find $L^{-1}\left\{\frac{1}{(s-1)(s+3)}\right\}$.

16. Find the Fourier series for the function $f(x) = x^2$ in the interval $[-\pi, \pi]$.

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

(b) Solve : $(2x + y)dx + (x + 2y)dy = 0$

18. Solve : $(D^2 + 1)y = e^{2x} + \sin 2x$

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