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C14–A/AA/AEI/CH/CHST/MET/
MNG/TT/BM–401

4401

BOARD DIPLOMA EXAMINATION, (C–14)
SEPTEMBER/OCTOBER - 2020
FOURTH SEMESTER (COMMON) 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. Solve $(D^2 \quad 5D \quad 6)y \quad 0$, where $D \quad \frac{d}{dx}$.

2. Solve $\frac{d^2y}{dx^2} \quad 4\frac{dy}{dx} \quad 4y \quad 0$.

3. Find the particular integral of $(D^2 \quad 3D \quad 2)y \quad e^{3x}$.

4. Find $L\{(t^2 \quad \sin 3t \quad 5)\}$.

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

6. Find $L^{-1}\left\{\frac{2}{s-4} - \frac{3}{s^2-9}\right\}$.

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

8. Find the value of a_0 in $f(x) = x$ in $0 < x < 2$.

9. Write down the formulae of Euler's constants for a function $f(x)$ in the interval $(\quad, \quad)$.

10. What is the probability of obtaining a total of 8 when a die is thrown?

PART—B 10×5=50

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

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

11. *(a)* Solve $(D^2 - 4D - 4)y = e^{2x} - e^{-2x}$.

(b) Solve $(D^2 - 4)y = x^2 - 3$.

12. Solve $(D^2 - 3D - 2)y = e^{4x} - x^2 - x$.

13. *(a)* Find $L(t\sin 2t)$.

(b) Find $L^{-1}\left\{\frac{1}{s(s^2-4)}\right\}$ using convolution theorem.

14. Use Laplace transform method to solve $(y'' - 3y' - 2y) = e^{-t}$ with $y(0) = 0$ and $y'(0) = 1$.

15. Find the Fourier series for $f(x) = x^2$ in the interval $[\quad, \quad]$.

16. Obtain the half-range cosine series for the function $f(x)$ $2x$ 1 in (0, 1).

17. *(a)* Four boys and four girls sit in a row at random. Find the probability that *(i)* the girls sit together and *(ii)* boys and girls sit alternatively.

(b) A card is drawn from a well-shuffled pack of playing cards. What is the probability that it is either a king or a spade?

18. *(a)* Let A and B be two events with $P(A)$ 1 / 6 and $P(A \quad B)$ 1 / 8. Then find $P(B / A)$.

(b) A bag contains 10 red and 5 white balls. Two balls are drawn one after the other without replacement. Find the probability that both balls drawn are red.

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