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BOARD DIPLOMA EXAMINATION, (C-14)
OCT/NOV—2018
DCE—FOURTH SEMESTER EXAMINATION
ENGINEERING MATHEMATICS-III

Time : 3 Hours]

[Total Marks : 80

PART—A

10×3=30

- Instruction :** (1) Answer **all** questions.
(2) Each question carries **three** marks.
(2) Answers should be brief and straight to the point and shall not exceed **five** simple sentences.

1. Solve $(D^2 + 3D + 2)y = 0$, where $D = \frac{d}{dx}$

2. Solve $\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} - \frac{dy}{dx} + y = 0$

3. Find the particular integral of $(D^2 + 1)y = \sin x$

4. Find $L\{\sin^2 t\}$

5. Find $L\{e^{-2t} \cdot \cos t\}$

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

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

8. Find the value of a_0 in the Fourier series of $f(x) = e^{ax}$ in $(0, 2\pi)$.

9. Write the Fourier sine series of $f(x)$ in $(0, 2)$.

10. Find the probability of getting a red ball when a ball is drawn from a bag containing 5 red, 2 black and 4 green balls.

PART—B

10×5=50

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

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

(2) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Solve $(D^2 + 2D - 8)y = e^{-3x} + e^{-4x}$

(b) Solve $(D^2 - 4D - 5)y = \cos 2x$

12. (a) Solve $(D^2 - 8D + 9)y = \sin 3x$

(b) Solve $(D^2 + 4)y = x^4$

13. (a) Find $L \left\{ \int_0^{\infty} e^{-2t} \cdot t \cdot dt \right\}$

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

14. Solve $y'' + y = 4e^t$ using Laplace transform method given that $y(0) = 0$ and $y'(0) = 0$.

15. Expand the function $f(x) = x^2$ as Fourier series in the interval $(-\pi, \pi)$

16. Obtain Fourier half range cosine series for $f(x) = \pi - x$ in the interval $0 \leq x \leq 2$.

17. (a) A given problem is solved by 3 students independently with probabilities of $2/5$, $1/2$ and $1/4$. What is the probability that the problem is solved.

(b) Find the probability of getting at least one tail if four coins are tossed once.

- * 18. (a) For any 2 events A & B, if $P(A) = 2/3$, $P(B) = 3/4$ and $P(A \cup B) = 5/6$. Find $P(A/B)$ and $P(B/A)$.
- (b) Two members A and B appear for an interview for the same post of two vacancies. The probability of A's selection is $1/7$ and that of B's selection is $1/5$. What is the probability that only one of them is selected.

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