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C14–M–401/C14–CHOT–401/C14–RAC–401

4477

BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2016

DME—FOURTH 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.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Solve :

$$(D^2 \quad 4D \quad 1)y \quad 0$$

2. Solve :

$$(D^3 \quad D^2 \quad D \quad 1)y \quad 0$$

3. Find the particular integral of $(D^2 \quad 1)y \quad e^x$.

4. Find $L(\cos^2 2t)$.

5. Evaluate $\int_0 te^{\ 3t}dt$.

6. Find inverse Laplace transform of

$$\frac{2}{S^2 \quad 4} \quad \frac{3S}{S^2 \quad 9}$$

7. Find

$$L^{1}\left\{\frac{S}{(S-2)^2-4}\right\}$$

8. Write down the formulas for finding Fourier constants for $f(x)$ in $(\quad, \quad)$.

9. Obtain the sine series of unity in $(0, \quad)$.

10. When two dice are thrown, find the probability of obtaining the total score 7.

PART—B 10×5=50

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

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

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

11. *(a)* Solve :

$$\frac{d^2y}{dx^2} - 7\frac{dy}{dx} - 6y = e^{3x}$$

(b) Solve :

$$(D^2 - 3D - 2)y = 2x^2$$

12. *(a)* Solve :

$$(D^2 - 4)y = \cos 2x - \sin x$$

(b) Solve :

$$(D^2 - 5D - 6)y = (e^x - 1)^2$$

13. *(a)* Find

$$L(te^{3t}\sin 2t)$$

(b) Find

$$L\ \frac{e^{at}\quad \cos bt}{t}$$

14. Solve the differential equation

$$\frac{d^2y}{dt^2}\quad 2\frac{dy}{dt}\quad 3y\quad \sin t$$

if $y(0)\quad y'(0)\quad 0$ by using Laplace transform method.

15. Find the Fourier series for $f(x)\quad x\quad x^2$ for the interval $(\quad ,\quad)$ and hence show that

$$\frac{1}{1^2}\quad \frac{1}{2^2}\quad \frac{1}{3^2}\quad \frac{1}{4^2}\quad \frac{1}{5^2}\quad \ldots\ldots\quad \frac{2}{12}$$

16. Expand $f(x)\quad e^x$ in the interval $(0,\ 2\ )$.

17. State and prove addition theorem of probability.

18. *(a)* A box contains 20 screws, 5 of which are defective. 2 screws are drawn at random. Find the probability that neither of the 2 screws is defective.

(b) Evaluate $P(A\quad B)$ if $2P(A)\quad P(B)\quad \frac{5}{13}$ and $P(A/B)\quad \frac{2}{5}$.

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