



C14-M-401/C14-CHOT-401/C14-RAC-401

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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 :

$$(D^2 - 4D - 1)y = 0$$

2. Solve :

$$(D^3 - D^2 - D - 1)y = 0$$

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

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

5. Evaluate $\int_0^1 t e^{3t} dt$.

6. Find inverse Laplace transform of

$$\frac{2}{s^2 - 4} - \frac{3s}{s^2 - 9}$$

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1

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7. Find *

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

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

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

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

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

14. Solve the differential equation

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

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

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

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \frac{1}{5^2} - \dots = \frac{2}{15}$$

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

17. State and prove addition theorem of probability.

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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 $P(A \cap B)$ if $2P(A) = P(B)$ and $P(A/B) = \frac{2}{5}$.
