

Nov.-Dec-2010
S.E.-Mech.
Sem-I

(2)

Total No. of Questions—12]

[Total No. of Printed Pages—8+2

[3862]-114

S.E. (Mech., Production, S/W)(First Sem.) EXAMINATION, 2010
ENGINEERING MATHEMATICS—III
(2008 COURSE)

Time : Three Hours

Maximum Marks : 100

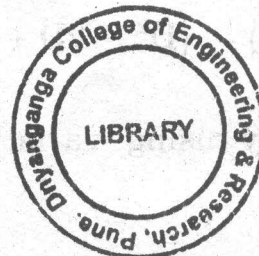
- N.B. :— (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6 from Section I and Q. No. 7 or Q. No. 8, Q. No. 9 or Q. No. 10, Q. No. 11 or Q. No. 12 from Section II.
- (ii) Answers to the two Sections should be written in separate answer-books.
- (iii) Neat diagrams must be drawn wherever necessary.
- (iv) Figures to the right indicate full marks.
- (v) Use of electronic pocket calculator is allowed.
- (vi) Assume suitable data, if necessary.

SECTION I

1. (a) Solve the following differential equations (any three) : [12]

(1) $(D^3 - D^2 - 6D)y = 1 + x^2$

(2) $(D^2 - 5D + 6)y = x \cos 2x$



P.T.O.

$$(3) \quad x^2 \frac{d^2 y}{dx^2} + 5x \frac{dy}{dx} + 3y = \frac{\log x}{x^2}$$

$$(4) \quad (D^3 - 4D)y = 2 \cosh^2(2x)$$

$$(5) \quad \frac{x dx}{z^2 - 2yz - y^2} = \frac{dy}{y+z} = \frac{dz}{y-z}$$

(b) Solve the simultaneous differential equations :

$$4 \frac{dx}{dt} + x - y = 0, \quad x + 2 \frac{dy}{dt} - y = 0$$

given $x = 20$ and $y = 100$ at $t = 0$.

[5]

Or

2. (a) Solve the following differential equations (any three) : [12]

$$(1) \quad (D^2 + 6D + 9)y = 5^x - \log 2$$

$$(2) \quad (D - 1)^2 (D^2 + 1)y = e^x + \sin^2 \frac{x}{2}$$

$$(3) \quad (x + 1)^2 \frac{d^2 y}{dx^2} + (x + 1) \frac{dy}{dx} = (2x + 3)(2x + 4)$$

$$(4) \quad (D^2 - 1)y = (1 + e^{-x})^2$$

$$(5) \quad (D^2 - 2D + 1)y = x^{3/2} e^x.$$

(by using variation of parameters method)

