R.N. -.....

GLA UNIVERSITY,MATHURA

First Mid Term Exam

Session (2010-11)

B.Tech. Ist yr

MM -40 | Mathematics I | Time : 90 Min

PART 1 (2 x 8 =16)

Attempt all questions :

Q1. The particular integral of the differential equation $d^2y/dx^2 - y = e^{2x}$ is .....

Q2. The 8^{th} derivarive of $y = 10x^6$ is .....

Q3. If $y = \log x^4$ then y_n is.....

Q4. If $y = 2 \sin 3x \cos x$ then y_n is.....

Q5. If $y = (x+1)^n$, $n \in N$, then y_{n+1} is.....

Q6. Complete solution of the differential equation $(D^2 - 3D + 2)y = 0$ is y = ...

Q7. Integrating factor for the differential equation $\cos^2 x \, d^2y/dx^2 + y = e^{2x}$

Q8. The complete solution of a differential equation of order m has m no of arbitrary constants .

(TRUE/FALSE)

PART 2

(5x3=15)

Attempt any one part from each question :

Q1. (a) If $y = x^{n-1}\log x$, prove that

$$y_n = \frac{(n-1)!}{x}$$

(b)Solve :

$$(D^3 - 3D^2 + 4D - 2)y = e^x$$

Q2. (a) If $y = e^{(a \sin^{-1} x)}$, prove that

$$(1- x^2)y_2 - xy_1 = a^2y$$

(b) Solve :

$$d^3y/dx^3 + 6\, d^2y/dx^2 + 11\, dy/dx + 6\, y = 0$$

Q3. (a) If $y = \sin(m \sin^{-1}x)$, prove that

$$(1- x^2)y_2 - xy_1 + m^2y = 0$$

(b) Solve :

$$(1 + x^2)\, dy/dx + y = e^{\sin^{-1} x}$$

PART C

(9x1=9)

Attempt any one of the following :

Q1. If $y = (x + \sqrt{1+x^2})^m$, prove that

$$(1+ x^2)y_{n+2} - (2n+1)xy_{n+1} + (n^2- m^2)\, y_n = 0$$

Q2. Solve:

$$(D^4 - 2D^3 - 3D^2 + 4D + 4)y = 0$$

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