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DMM-3101

Second Year B. Sc. (Sem. - IV) Examination

March/April – 2016

MCS-403 : Differential Equations-II

(Mathematics for Comp. Sc.)

(New Course)

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :
☛ **Second Year B. Sc. (Sem. - IV)**

Name of the Subject :
☛ **MCS-403 : Differential Equations-II (New)**

☛ Subject Code No. : 3 1 0 1 ☛ Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

(2) All questions are compulsory.

(3) Figures to the right indicate full marks.

1 Attempt any **five** :

(1) Find the general solution of $\frac{d^2y}{dx^2}+4y=e^x$.

(2) Obtain C.F. of $\frac{d^2y}{dx^2}+2\frac{dy}{dx}+3y=0$.

(3) Convert $x^2\frac{d^2y}{dx^2}-5x\frac{dy}{dx}+9y=x^5$ into linear different equation with constant coefficient.

(4) Eliminate the arbitrary function from $z=e^{xy}\phi(x-y)$.

(5) Solve $25r-40s+16t=0$.

(6) Solve $\frac{\partial^4 z}{\partial x^4}-\frac{\partial^4 z}{\partial y^4}=0$.

(7) Find C.F. of $(D^3-2D^2D'+DD'^2)\, z=0$.

(8) Solve $z=px+qy+pq$.

2 (a) Describe the method of finding the P.I. of **5**

$f(D)_y = \sin ax;$ where $D = d/_{dx}$ and

$f(D) = D^n + P_1 D^{n-1} + ... + P_n (P_1, P_2, ...P_n \in R) \phi(-a^2) \neq 0.$

OR

(a) Describe the method of finding general solution of **5**

$$\frac{x^n d^n y}{dx^n} + P_1, x^{n-1} \frac{d^{n-1} y}{dx^{n-1}} + ... + P_n y = X(x).$$

(b) Solve any **two** : **10**

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

(2) $\frac{d^4 x}{dx^4} + 2\frac{d^2 y}{dx^2} + y = x^2 \cos x$

(3) $x^2 \frac{d^2 y}{dx^2} + 5x\frac{dy}{dx} + 4y = x^4$

(4) $(x+a)^2 \frac{d^2 y}{dx^2} - 4(x+a)\frac{dy}{dx} + 6y = x$.

3 (a) Describe Layrage's method to solve liner partial Different equation of the first order. **5**

OR

(a) Form the P.D.E. by eliminating an arbitrary function ϕ from the relation $\phi(u, v) - 0$; where u and v are functions of $x.y$ and z.

(b) Attempt any **two** :

(1) Solve $(x + 2z)p + (4zx - y)q = 2x^2 + y$

(2) Solve : $xzp + yzq = xy$

(3) From the partial Different using the relation $z = (x+a)(y+b)$.

(4) Eliminate the arbitrary function f and ϕ from $z = f(ax+by) + \phi(ax-by)$.

4 (a) Discuss the method of solving partial Different from the following : (any **one**)

(1) $f(z, p, q) = 0,$

(2) $f_1(x, p) = f_2(y, a).$

(b) Solve any **two** : **10**

(1) $P^2 + q^2 = n^2$

(2) $z = px + qy + \log pq$

(3) $z = pq$

(4) $q = p + x - y = 0$

5 (a) Discuss the rules for evaluating $\frac{1}{F(D, D')}\phi(ax + by)$ **5**

where $F(a, b) = 0.$

OR

(a) Discuss the general method of finding the particular integral of the equation $(D - mD')z = f(x, y).$ **5**

(b) Solve any **two** :

(1) $\frac{\partial^2 z}{\partial x^2} + 3\frac{\partial^2 z}{\partial x \partial y} + 2\frac{\partial^2 z}{\partial y^2} = x + y$

(2) $(D^2 - 2DD' + D'^2)z = e^{x+2y}$

(3) $r - 2s + l = \sin(2x + 3y)$

(4) $(D^2 - 6DD' + 9D'^2)z = 12x^2 36xy \cdot$