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B.Sc. (Hons.) Chemistry (Semester – 3rd)

MATHEMATICS-III

Subject Code: BMATH5301

Paper ID: [19131622]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a. Solve : $dy/dx + y \tan x = \sec x$
- b. Show that the differential equation $2x \sin 3y \, dx + 3x^2 \cos 3y \, dy = 0$ is exact and hence solve it.
- c. Classify the following differential equation : $r = x^2 t$
- d. Find the general solution of the differential equation : $4u_{xx} - u_{yy} = 0$
- e. Solve : $xp^2 - yp + a = 0$
- f. Solve: $(D^2 + 4D + 13)y = 0$
- g. Find general solution of $(Dx + 1)(Dx + Dy - 1)z = 0$
- h. Define Laplace equation
- i. Explain Exact euqation
- j. Explain Cauchy Euler equation.

Section – B

(5 marks each)

Q2. Find the general solution of $r + 2s + t = x^2 + xy + y^2$.

Q3. Solve the following differential equation

$$x \, dx + y \, dy + (x \, dy - y \, dx) / (x^2 + y^2) = 0$$

Q4. Find the general solution of following lagrange's linear equation

$$x(y-z)p + y(z-x)q = z(x-y)$$

Q5. Find the general solution of $r - s + p = 0$

Q6. Solve : $(4D^2 + 4D - 3)y = xe^{2x}$

Section – C

(10 marks each)

Q7. Obtain the solution of one – dimensional heat equation by the method of separation of variables.

Q8. Solve the differential equation : $dy/dx - y \tan x = \sin x \cos 2x / y^2$

Q9. Solve the following differential equations by the method of variation of parameters:

$$(D^2 + 4)y = 4 \sec^2 2x$$