Q.5 a) Reduce the following matrix into its normal form and find its rank.

$$A= \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$

b) Find the Eigen values and Eigen vectors for the given matrix.

$$A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$$

Q.6 a) Obtain the partial differential equation by eliminating the arbitrary function f:

$$z = f\left(y/x \right)$$

b) Solve the following p.d.e

$x(y^2+z)p$-$y(x^2+z)q = z (x^2$-$y^2)$

Q.7 a) Solve the partial differential equation yq-xp=z

b) Solve the equation x^2p^2+y^2q^2=z^2

Q.8 a) Solve the following differential equation by method of variation of parameter.

$$\frac{d^2y}{dx^2} + y = tanx$$

b) Obtain the partial differential equation from the relation $z= (x+a) (y+b)$

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Enroll No…………………

MA-21
B.Tech.– II Sem (Ex.)
Examination, March-2021
Mathematics-II
Time: Three Hours

Maximum Marks:70

Note: Attempt any five questions. (Each question carries equal marks)

Q.1 a) Solve $\frac{dx}{dt} + y = sint$

$\frac{dy}{dt} + x = cost$

b) Solve the differential equation
$\frac{d^2y}{dx^2} - 2tanx \cdot y - 5y = 0$ by reducing it in normal form.

$A= \begin{vmatrix} 5 & 4 \\ 1 & 2 \end{vmatrix}$

Q.2 a) Solve $y \, dx + (1 - x^2) \, tan^{-1}x \cdot dy = 0$

b) Solve the differential equation

$x \, dy - y \, dx = \sqrt{x^2 + y^2}dx$

Q.3 a) Solve $\left| \frac{\partial^3 x}{\partial x^3} - 3\frac{\partial^3 x}{\partial x^2 \partial y} + 2\frac{\partial^3 z}{\partial x \partial y^2} = 0 \right|$

b) Solve the partial differential equation

(D - D' - 1) (D - D' - 3) z=0

Q.4 a) Solve the partial differential equation

$\left| \frac{\partial^2 z}{\partial x^2} + 3\frac{\partial^2 z}{\partial x \partial y} + 2\frac{\partial^2 z}{\partial y^2} = x + y \right|$

b) Solve the equation $zp+yq=x$