

Rishi Bankim Chandra Evening College
B.Sc. (General) 2nd Semester Internal Examination
Subject – Differential Equations
Subject Code – MTMGCOR02T

Time – 60 minutes

F.M.-20

Answer any ten questions from the following

10×2=20

1. Find the order and degree of the differential equation $\sqrt{1 + \left(\frac{dy}{dx}\right)^2} = 1 + x$.
2. Find the differential equation of: all parabolas having their axes parallel to the x-axis.
3. Show that $(2x^3 + 4y)dx + (4x + y - 1)dy$ is exact differential equations.
4. Solve $\frac{dy}{dx} + \frac{x}{1-x^2}y = x\sqrt{y}$.
5. Solve $\cos y dx + (1 + e^x) \sin y dy = 0$.
6. Solve $p^2 + 2px + py + 2xy = 0$, where $p = \frac{dy}{dx}$.
7. Solve $x = y - p^2$.
8. Solve $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 4y = 0$.
9. Find the particular integral (P.I) of the differential equation $(D - 2)^2y = x^2e^{2x}$.
10. Solve $\frac{dx}{dt} = 5x + 4y$, $\frac{dy}{dt} = -x + y$.
11. Classify the partial differential equation $3\frac{\partial^2z}{\partial x^2} + \frac{\partial^2z}{\partial x\partial y} + 2\frac{\partial^2z}{\partial y^2} = 0$.
12. Find the complementary function of the differential equation $\left(\frac{d^2y}{dx^2} + 4\right)y = x^2$.
13. Find the equation of the curve whose cartesian subtangent is constant and passes through the point (1,1).
14. Solve $p + 3q = 5z + \tan(y - 3x)$, where $p = \frac{\partial z}{\partial x}$, $q = \frac{\partial z}{\partial y}$.
15. Solve $a(p + q) = z$, where $p = \frac{\partial z}{\partial x}$, $q = \frac{\partial z}{\partial y}$.