Roll No. .....
2500 -/30/30/40

N-08

January 2019

Bachelor of Computer Applications (BCA) Examination

IIIrd Semester

MATHEMATICS – III

Time 3 Hours] [Max. Marks 40

Note : Solve all questions. Solve any two parts from each question. All questions carry equal marks.

1. (a) Solve : $(2x + y - 3)\,dy = (x + 2y - 3)\,dx$.
   (b) Solve : $(1 + y^2)\,dx = (\tan^{-1} y - x)\,dy$.
   (c) Solve : $p^3 - 2xyp + 4y^2 = 0$.
2. (a) Find the orthogonal trajectories of the family of curves $3xy = x^3 - a^3$; a being parameter of the family.
   (b) Solve : $(D^2 - 4D + 4)\,y = e^x + \cos 2x$.
   (c) Solve : $x^2 \frac{d^2y}{dx^2} + 5x \frac{dy}{dx} + 4y = x \log x$.
3. (a) Solve by method of variation of parameter :
   $$\frac{d^2y}{dx^2} + a^2y = \operatorname{cosec} ax.$$
   (b) Solve the simultaneous equations :
   $$\frac{d^2x}{dt^2} - 3x - 4y = 0$$
   $$\frac{d^2y}{dt^2} + x + y = 0.$$
   (c) Solve : $\frac{dx}{1} = \frac{dy}{3} = \frac{dz}{5z + \tan(y - 3x)}$.
4. (a) Solve $\frac{d^2y}{dx^2} + y = 0$ in series solution about $x = 0$.
   (b) Solve by Picard's successive approximation method :
   $\frac{dy}{dx} = x + y^2$ where $y(0) = 0$.
   (c) Solve : $y'' + y' - 2y = 0$ where $y(0) = 0$, $y(1) = e - \frac{1}{e^2}$.
5. (a) Solve by Charpit method $z = pq$.
   (b) Solve : $r + 3s + 2t = x + y$.
   (c) Solve : $x^2p + y^2q = z^2$.