(Please Write your Roll No. Immediately) Roll No. ....

Mid- Term Examination

Course & Semester: B.Tech , Ist Sem. Feb-March 2022

Paper Code: BS-111 Subject: Applied Mathematics-I

Time:1.5 hours Max.Marks:30

Note: Q.No. 1 is compulsory. Attempt any two more Question from the rest.

Q.1 (Marks 2X5=10)

(a). Find the distance of the point whose spherical polar coordinate are $(2\sqrt{2}, \frac{\pi}{4}, \frac{\pi}{6})$ from the point whose Cartesian Coordinate are $(2\sqrt{3}, -1, -4)$. CO1

(b) Find $\frac{d}{dx}\int_{x^2}^{x^3}\left[\frac{1}{logt}\right]dt$ CO1

(c) Find the P.I for differential equation $\frac{d^2y}{dx^2}+\frac{dy}{dx}+10y=\log 2$. CO2

(d) Solve the differential equation $\frac{dy}{dx}=e^{x-y}+x^2e^{-y}$ CO2

(e) Find the stationary point for $f(x,y)=y^2+4xy+3x^2+x^3$ CO1

Q2. (Marks 2x5=10)

(a) If $u=\log(x^3+y^3+z^3-3xyz)$,Show that $(\frac{\partial}{\partial x}+\frac{\partial}{\partial y}+\frac{\partial}{\partial z})^2u=-\frac{9}{(x+y+z)^2}$ CO1

(b) Given $\frac{dy}{dx}=\frac{y-x}{y+x}$,with the initial condition $y=1$ at $x=0$. Find y for x=.2 (by taking h=.1) by using Euler's method CO2

Q3. (Marks 2x5=10)

(a) Find the dimension of rectangular box of maximum capacity whose surface area is given when box ix closed at the top. CO1

(b) Solve $\frac{d^2y}{dx^2}+y=\sin x\sin 2x$ CO2

Q4 (Marks 2x5=10)

(a) If $u=x+y+z$, $u^2v=y+z$, $u^3w=z$ .Then find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$. CO1

(b) Solve $x^2\frac{d^2y}{dx^2}+6x\frac{dy}{dx}+6y=x\log x$. CO2.