FEDERAL URDU UNIVERSITY OF ARTS, SCIENCE & TECHNOLOGY, GULSHAN-E-IQBAL, KARACHI

BS-III (Computer Science)

Examination 2020(Final Term)

(Regulars)

Course: Differential Equations Section: C

Max. Marks: 60 Time Allowed:09AM-09PM

Note:

Attempt any 8 questions from Q1-Q10.

Q11 and Q12 are compulsory

Show all steps of simplification.

Q1.

i. This is the solution of a differential equation then what will be its Differential Equation.

$$u(t) = fe^{t} + ge^{2t} + he^{3t}$$

ii. Solve by appropriate method

$$\sqrt{1 + x^2 + y(x)^2 + x^2 y(x)^2} + xy(x)y'(x) = 0$$

Q2. Find the type of differential equations and solve any one of them.

$$y - x\frac{dy}{dx} = a\left(y^2 + \frac{dy}{dx}\right)$$

$$(1 + y^2)dx = (\tan^{-1} y - x)dy$$

Q3.

i. Solve the first order differential equation.

$$\frac{dy}{dx} = \frac{x + 2y - 3}{2x + y - 3}$$

ii. Solve the given initial value problem by appropriate method.

$$xylog\left(\frac{x}{y}\right)dx + \left(y^2 - x^2 \log\left(\frac{x}{y}\right)\right)dy = 0 \qquad y(1) = 0$$

Q4. Find the general solution of any one of following Differential Equations

$$cosx\frac{dy}{dx} + 4ysin\, x = 4\sqrt{y}\sec x$$

$$\left[y\left(1 + \frac{1}{x}\right) + cosy\right]dx + (x + logx - x\, siny\,)dy = 0$$

Q5. Find the type of following equations then solve any one of them.

$$(xysin\,xy + \cos xy\,)y\,dx + (xysin\,xy - cosxy)xdy = 0$$

$$sinx\frac{dy}{dx} + 2y = \tan^3\frac{x}{2}$$

Q6. Solve for y.

$$(D^4 - 4D^3 + 8D^2 - 8D + 4)y = 0$$

Q7. Find the Solution of any one of following equations.

i. $(D^2 + a^2)y = \frac{a^2R}{P}(l - x)$

Where a, R, P, l are constant and subject to the conditions $y = 0, Dy = 0$ at $x = 0$

ii. $\frac{d^2x}{dt^2} + \frac{g}{l}x = \frac{g}{l}L$

Where g, l, L are constant and subject to the conditions $x = a, \frac{dx}{dt} = o\ at\ t = 0$

Q8. Solve any one of them.

$$(D^2 - 4D + 4)y = 8x^2e^{2x}sin2x$$

$$(1 + x)^2\frac{d^2y}{dx^2} + (1 + x)\frac{dy}{dx} + y = 2sin(\ln(1 + x))$$

Q9. Reduce the order of differential equation then solve it.

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

Q10. Solve by method of variation of parameter.

$$\frac{d^3x}{dt^3} - 2\frac{dx}{dt} + 4x = e^tcost$$

Q11.

i. Find the partial differential equation of

$$z = ae^{bx}coshy$$

ii. Solve.

$$(xy^3 - 2x^4)p + (2y^4 - x^3y)q = 9z(x^3 - y^3)$$

Q12. Solve any two of the following.

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

$$x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} + t\frac{\partial z}{\partial t} = xyt$$

$$px(z - 2y^2) = (z - qy)(z - y^2 - 2x^3)$$

After completing the solution of this paper please upload pdf file attached with your admit card in google classroom and send at **asadfuuast1@gmail.com**