SYBSc SEMESTER IV
MATHS III
SAMPLE QUESTIONS

1. The order and degree of the differential equation $8\frac{d^2y}{dx^2} + 3\frac{dy}{dx} - 5\int y\,dx = 7x^2$ is

(a) 2 and 1 (b) 2 and 2
(c) 3 and 1 (d) 3 and 2

2. The function $f(x, y) = 4x^2 - \frac{y^3}{x}$ is homogenous function of degree ____ in *x*, *y*.

(a) 1 (b) 2
(c) 3 (d) 0

3. The solution of the equation $\frac{d^2y}{dx^2} = 4y$ where a and b are arbitrary constants is

(a) $y = ae^{-2x} + be^{2x}$ (b) $y = ae^{-2x} + be^{3x}$
(c) $y = ae^{2x} + bxe^{2x}$ (d) $y = axe^{-2x} + bxe^{2x}$

4. For what value of n the equation $(x + ye^{2xy})dx + nxe^{2xy}\,dy$ is exact?

(a) 1 (b) 2
(c) 3 (d) 4

5. If $y_1 = x^2$ is a solution of $x^2y'' - xy' = 0$, then the other linearly independent solution is

(a) $y_2 = {}^1/_{x^2}$ (b) $y_2 = x$
(c) $y_2 = {}^1/_{x}$ (d) 1

6. Wronskian of $y_1 = cos2x$ and $y_2 = sin2x$ is
(a) 1 (b) 2
(c) 3 (d) -1

7. Trial function for calculating particular integral of the differential equation $y'' - 2y' + y = e^x + 1$ is

(a) $Ax + b$ (b) $Ae^x + B$
(c) $Axe^x + B$ (d) $Ax^2e^x + B$

8. If $y = A\sin 2x + B\cos 2x$ is the trail solution of $y'' - 5y' + 6y = \sin 2x$, then

(a) $A = \frac{1}{52}, B = -\frac{5}{52}$ (b) $A = -\frac{1}{52}, B = -\frac{5}{52}$
(c) $A = -\frac{1}{52}, B = \frac{5}{52}$ (d) $A = \frac{1}{52}, B = \frac{5}{52}$

9. The auxiliary equation of the following linear system of homogeneous differential equations $\frac{dx}{dt} = a_1x + b_1y$ and $\frac{dy}{dt} = a_2x + b_2y$ is
(a) $m^2 - (a_1 + b_2)m + a_1b_2 - a_2b_1$ (b) $m^2 - (a_2 + b_1)m + a_1b_2 - a_2b_1$
(c) $m^2 - (a_1 + b_2)m + a_1b_1 - a_2b_2$ (d) $m^2 - (a_2 + b_1)m + a_1b_1 - a_2b_2$

10. The auxiliary equation of the linear system of homogeneous differential equations $\frac{dx}{dt} = 5x + 4y$ and $\frac{dy}{dt} = -x + y$ has
(a) real and distinct roots (b) roots which are complex conjugates
(c) real and repeated roots (d) No root