

## Multiple Choice Problems

Q.No	1	2	3	4	5	6	7	8
Answer								

**Q1.** The DE:  $y' = \sqrt{2y+2}$  has a unique solution passing through the point

- (a)  $(-2,5)$ , (b)  $(-3,-1)$ , (c)  $(0,1/2)$ , (d) None of these

**Q.2** A half life of a radioactive material is:

- (a) Time needed for the half of the material to decay, (b) Time needed for the whole material to decay  
(c) Half time needed for the half of the material to decay, (d) None of these

**Q.3.** The value of the slope at  $(\frac{\pi}{2}, 1)$  of the curve  $y^2 \sin x = \frac{2}{\pi} x$  is:

- (a)  $-2/\pi$ , (b)  $2/\pi$ , (c)  $1/2\pi$ , (d)  $1/\pi$ .

**Q.4.** . Suppose that a population  $P$  grows at a rate proportional to the square of the population present at time  $t$ , the DE of the model is:

- (a)  $\frac{dp}{dt} = kt$ , (b)  $\frac{dp}{dt} = -kt$ , (c)  $\frac{dp}{dt} = -kp^2$ , (d)  $\frac{dp}{dt} = kp^2$

**Q.5.** The DE:  $y' = xy\sqrt{2x-5}$  has a unique solution passing through the point

- (a)  $(1,4)$ , (b)  $(2,1)$ , (c)  $(0,6)$ , (d) None of these

**Q.6** Identify the differential equation  $(3x^3y + xe^y)dx + (x^4 + x^2e^y + \frac{x}{1+y^2})dy = 0$ . Assume that  $y = f(x)$

- (a) Exact, (b) Linear, (c) Homogeneous, (d) None of these

**Q.7.** The differential equation  $M(x, y)dx + (x^2 - 2xy)dy = 0$  is exact, if

- (a)  $M(x, y) = y(2x - y) + \alpha(x)$ , (b)  $M(x, y) = 2xy - y^2 + \alpha(y)$ ,  
(c)  $M(x, y) = x(2x - y) + 1$ , (d) Non of these.

**Q.8.** Identify the differential equation  $(y^3 - xy^2)dy - (2y^2x + x^2y)dx = 0$ . Assume that  $y = f(x)$

- (a) Homogeneous, (b) Linear, (c) Exact, (d) None of these

**Q.9.** Solve the initial value problem:  $y' = (2x + 2y + 4)^2$ ,  $y(1) = 1$

**Q.10.** Find  $p$  such that  $y^p$  will be an integrating factor for the DE:  $(y^2 + 2xy)dx = x^2dy$  and solve the DE.

**Q.11.** Solve the DE:  $xy' = y^2(1 + 2y^2)$ .

**Q. 12.** Solve the DE:  $(x + 1)dy = (2xe^{-x} - xy - 2y)dx$