## **CHAPTER 9**

## **DIFFERENTIAL EQUATIONS**

## **TRUE FALSE QUESTIONS**

| Q. NO. | Questions  |  |  |  |
|--------|--|--|--|--|
| 1      | The general solution of the differential equation $\frac{dy}{dx} = e^{x^+y}$                     |  |  |  |
|        | is $e^{x} + e^{-y} = c$  |  |  |  |
|        | (a) True<br>(b) False  |  |  |  |
| 2.     | The integrating factor of the differential equation  |  |  |  |
|        | $x\frac{dy}{dx} - y = 2x^2 \text{ is } \frac{1}{x}.$   |  |  |  |
|        | (a) True   |  |  |  |
| 2      | (b) False<br>The differential equation $y dy = y (y + y) dy = 0$ is homogeneous equation         |  |  |  |
| 3.     | (a) True $(a)$ True  |  |  |  |
|        | (b) False  |  |  |  |
| 4.     | The number of arbitrary constants in particular solution of a differential equation of third     |  |  |  |
|        | order is 3.  |  |  |  |
|        | (a) True   |  |  |  |
|        | (b) False  |  |  |  |
| 5.     | A differential equation of the form $(dy/dx)=h(y/x)$ can be solved by making the substitution x= |  |  |  |
|        | vy.<br>(a) True  |  |  |  |
|        | (b) False  |  |  |  |
| 6.     | The degree of the differential equation $(\frac{d^2 y}{dx})^3 - (dy/dx) = y^3$ is 2              |  |  |  |
|        | (a) True   |  |  |  |
|        | (b) False  |  |  |  |
| 7.     | The solution of the differential equation $2x(dy/dx) - y = 3$ represents a circle.               |  |  |  |
|        | (a) True   |  |  |  |
|        | (b) False  |  |  |  |
| ð.<br> | The differential equation xdy $-$ ydx = is a homogeneous equation.                               |  |  |  |
|        | (a) True   |  |  |  |
|        | (b) False  |  |  |  |

| 9.  | The solution of the differential equation ydx +(x-y <sup>3</sup> )dy is  |
|-----|--|
|     | $xy = y^4/4 + c.$  |
|     | (a) True   |
| 10  | (b) False  |
| 10. | The general solution of the differential equation $\frac{d^2 y}{dx^2} + y = 0$ is  |
|     | y=a cos x.   |
|     | (a) True   |
|     | (b) False  |
| 11  | The order of differential equation $\frac{d^2 y}{dx^2}$ +y =0 is 2   |
|     | (A) T (B) F  |
| 12. | The degree of the differential equation $\frac{dy}{dx}$ +Sin( $\frac{dy}{dx}$ ) = 0 is 1                                       |
|     | (A) T (B) F  |
| 13. | The order of differential equation $\frac{d^3 y}{dx^3} + x^2 (\frac{d^2 y}{dx^2})^3 = 0$ is 2                                  |
|     | (A) T (B) F  |
| 14. | The degree of differential equation is $\frac{d^3 y}{dx^3} + 2(\frac{d^2 y}{dx^2})^2 + \frac{dy}{dx} + y = 0$ is 2 (A) T (B) F |
| 15. | The number of arbitrary constants in the particular solution of a differential equation of third order are/is 1<br>(A) T (B) F |
| 16. | The number of arbitrary constants in the general solution of a differential equation of third order are/is 3<br>(A) T (B) F    |
| 17. | The differential equation of the family of circles touching the x-axis at origin is $\frac{dy}{dx} = \frac{2}{x^2 + y^2}$      |
|     | (A) T (B) F  |
| 18. | Integrating factor for linear differential equation of the form  |
|     | $\frac{dy}{dx} + Py = Q \text{ is}$  |
|     | (A) T (B) F  |
| 19. | $(x-y)\frac{dy}{dx} = x + 2y$ is homogeneous differential equation   |
|     | (A) T (B) F  |
| 20. |  |

|    | The general solution of differential equation is $x\frac{dy}{dx} + 2y = x^2 (x \neq 0)$ is $y = x^2 + cx^{-2}$       |  |  |  |
|----|--|--|--|--|
|    | (A) T (B) F  |  |  |  |
| 21 | The integrating factor of the differential equation of the form $\frac{dx}{dy} + Px = Q$ is given by (T/F)           |  |  |  |
| 22 | The degree of the differential equation $y'' + y' = ln(y'')$ is <sup>2</sup>   |  |  |  |
|    | (T/F)  |  |  |  |
| 23 | The curve for which the normal at any point passes through the origin is a circle centre at the origin. (T/F)        |  |  |  |
| 24 | The solution of the differential equation cotydx=xdy is x=ccosy. (T/F)   |  |  |  |
| 25 | If x= Acos4t + Bsin4t, then $\frac{d^2 x}{dt^2} = -16_x$ . (T/F)   |  |  |  |
| 26 | The integrating factor of the differential equation  |  |  |  |
|    | $x\frac{dy}{dx} - y = 2x^2 \text{is x. (T/F)}$   |  |  |  |
| 27 | Every linear differential equation has always degree one (T/F)   |  |  |  |
| 28 | Order of a differential equation is defined as the order of the highest order derivative of the                      |  |  |  |
|    | dependent variable with respect to the independent variable involved in the givendifferential                        |  |  |  |
|    | equation.  |  |  |  |
| 29 | Order and degree (if defined) of a differential equation are alwayspositive integers.                                |  |  |  |
| 30 | Degree of a given differential equations is not defined if the given differential equationis not                     |  |  |  |
|    | a polynomial equation in itsderivatives.   |  |  |  |
| 31 | The solution which contains arbitrary constants is called the particular solution(primitive) of                      |  |  |  |
|    | the differential equation.   |  |  |  |
| 32 | The solution free from arbitrary constants i.e., the solution obtained from the generalsolution                      |  |  |  |
|    | by giving particular values to the arbitrary constants is called a particularsolution of the                         |  |  |  |
|    | differential equation.   |  |  |  |
| 33 | The function y = $e^{-3_x}$ is a solution of the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6_y = 0$ |  |  |  |
| 34 | The function y = a cosx+ b sin x, where, a, b $\in \mathbf{R}$ is aparticular solution of the differential           |  |  |  |
|    | equation $\frac{d^2y}{dx^2} + y = 0$ .   |  |  |  |

| 35 | The differential equation $x \frac{dy}{dx} - y = 0$ representing the family of curves y = mx, where mis                   |
|----|---|
|    | arbitrary constant.   |
| 36 | A differential equation of the form $\frac{dy}{dx} = F(x, y)$ is said to be homogenous if F(x, y) is a                    |
|    | homogenous function of degree two.  |
| 37 | The Integrating Factor of differential equation   |
|    | $(\tan^{-1}y - x) dy = (1 + y^2) dx is etan^{-1_x}$   |
| 38 | Every linear differential equation has always degree one (T/F)  |
| 39 | The degree of the differential equation x – $\cos \frac{dy}{dx} = 0$ is one. (T/F)  |
| 40 | The equation of the curve through the origin satisfying the equation $dy = (\sec x + y \tan x) dx$ is y cos x = x. (T/F)  |
| 41 | The curve for which the normal at any point passes through the origin is a circle centred at the origin. (T/F)            |
| 42 | The number of arbitrary constants in the general solution of a differential is same as its order. (T/F)                   |
| 43 | The D.E $\frac{d^2y}{dx^2} + 2(\frac{dy}{dx})^2 + 9y = x$ is a non-linear differential equation, because differential co- |
|    | efficient $\frac{dy}{dx}$ has exponent 2. (T/F)   |
| 44 | The integrating factor of the differential equation of the form $\frac{dx}{dy} + Px = Q$ is given by                      |

## **ANSWERS**

| Q. NO. | Answer | Q. NO. | Answer |
|--------|--------|--------|--------|
| 1      | Т      | 23     | Т      |
| 2      | Т      | 24     | F      |

| 3  | F | 25 | Т |
|----|---|----|---|
| 4  | F | 26 | F |
| 5  | Т | 27 | Т |
| 6  | F | 28 | Т |
| 7  | F | 29 | Т |
| 8  | Т | 30 | Т |
| 9  | Т | 31 | F |
| 10 | F | 32 | Т |
| 11 | Т | 33 | Т |
| 12 | F | 34 | F |
| 13 | F | 35 | Т |
| 14 | F | 36 | F |
| 15 | F | 37 | Т |
| 16 | Т | 38 | Т |
| 17 | Т | 39 | Т |
| 18 | Т | 40 | Т |
| 19 | Т | 41 | Т |
| 20 | Т | 42 | Т |
| 21 | F | 43 | Т |
| 22 | F | 44 | F |

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