



**Avinashilingam Institute for Home Science and Higher Education for Women**  
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)  
Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B  
Coimbatore - 641 043, Tamil Nadu, India

**Bachelor's Degree Examination – June / July 2021**  
**II Semester**

**Class : I UG**  
**Major : Mathematics**

**Time : 3 Hours**  
**Max. Marks : 100**

**18BMAC06 Differential Equations**

**Part A**  
**Choose the Correct Answer**

**10 x 1 = 10**

- The solution of  $\frac{dy}{dx} + Py = Q$  is CO1 K3
  - $ye^{\int P dx} = \int Qe^{\int P dx} dx + c$
  - $y = \int Qe^{\int P dx} dx + c$
  - $e^{\int P dx} = \int Qe^{\int P dx} dx + c$
  - $ye^{\int P dx} = \int Qe^{\int P dx} dx$
- The solution of  $a(xdy + 2ydx) = xydy$  is CO1 K3
  - $a \log(x^2) = y + c$
  - $a \log(yx^2) = y + c$
  - $a \log(yx^2) = y$
  - $\log(yx^2) = y + c$
- The solution of  $y = px + \frac{a}{p}$  is CO1 K6
  - $y = cx + a$
  - $y = cx + \frac{a}{c}$
  - $y = cx$
  - $y = \frac{a}{c}$
- The solution of  $p^2 - 5p + 6 = 0$  is CO1 K6
  - $(y - 2x + c)(y - 3x + c) = 0$
  - $(y - 2x + c)(y + 3x + c) = 0$
  - $(y + 2x + c)(y + 3x + c) = 0$
  - $(y^2 - 2x + c)(y^2 - 3x + c) = 0$
- The solution of  $(D^2 - 5D + 6)y = 0$  is CO1 K2
  - $y = A e^{2x} + B e^{3x}$
  - $y = A e^{5x} + B e^x$
  - $y = A e^{-3x} + B e^{-2x}$
  - $y = A e^{2x} + B e^{4x}$
- The particular integral of the equation  $(D^2 - 1)y = e^x$  is CO1 K2
  - $\infty$
  - $\frac{xe^x}{x}$
  - $\frac{x^2}{2} e^x$
  - $\frac{x}{2} e^x$
- The solution of partial differential equation which contains as many arbitrary constants as there are independent variables is called CO4 K2
  - Complete integral
  - Singular integral
  - General integral
  - Particular integral
- The partial differential equation by eliminating a, b from  $z = a x + b y + a$  is CO4 K2
  - $z = a p + b q + a$
  - $z = a p$
  - $z = a p + b q$
  - $z = px + qy + p$
- The form of Clairant's equation in partial differential equation is CO4 K5
  - $z = px$
  - $z = p x + q y$
  - $z = p x + q y + f(p, q)$
  - $z = f(p, q)$
- If  $p = 2qx$  and  $q = a$ , then  $z =$  CO4 K5
  - $z = a x^2 + a y + c$
  - $z = a x^2 + b y + c$
  - $z = b x^2 + b y + c$
  - $z = b x^2 + a y + c$

**Part B****5 x 6 = 30****Answer ALL questions****Each answer should not exceed 400 words or two pages**

- 11.a. Solve  $ydx - xdy + 3x^2y^2e^{x^3}dx = 0$ . CO1 K4  
 (or)  
 11.b. Solve  $(a^2 - 2xy - y^2)dx - (x + y)^2dy = 0$ . CO1 K4
- 12.a. Solve  $y = xp + x(1 + p^2)^{1/2}$ . CO2 K2  
 (or)  
 12.b. Solve  $(D^2 + 4)y = x \sin x$ . CO2 K2
- 13.a. Solve  $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - 3y = x^2$ . CO2 K5  
 (or)  
 13.b. Solve  $x^2 \frac{d^2y}{dx^2} + 2x \frac{dy}{dx} = 6x^2 + 2x + 1$ . CO2 K5
- 14.a. Eliminate h and k from the relation  $(x - h)^2 + (y - k)^2 + z^2 = r^2$ . CO4 K4  
 (or)  
 14.b. Eliminate f from the equation  $f(x^2 + y^2 + z^2, z^2 - 2xy) = 0$ . CO4 K4
- 15.a. Solve  $q = 2yp^2$ . CO5 K6  
 (or)  
 15.b. Solve  $p^2 + q^2 = x + y$ . CO5 K6

**Part C****5 x 12 = 60****Answer ALL questions****Each answer should not exceed 800 words or four pages**

- 16.a. Solve  $(1 - x^2) \frac{dy}{dx} + 2xy = x\sqrt{1 - x^2}$  given that  $y=0$  when  $x=0$ . CO2 K2  
 (or)  
 16.b. Solve  $\frac{dy}{dx} - y \tan x = \frac{\sin x \cos^2 x}{y^2}$ . CO2 K2
- 17.a. Solve  $(D^2 + 2D + 5)y = xe^x$ . CO2 K5  
 (or)  
 17.b. Solve  $(D^2 - 4D + 3)y = e^x \cos 2x + \cos 3x$ . CO2 K5
- 18.a. Solve  $(x + a)^2 \frac{d^2y}{dx^2} - 4(x + a) \frac{dy}{dx} + 6y = x$ . CO3 K6  
 (or)  
 18.b. Solve  $x^2 \frac{d^2y}{dx^2} + (4x^2 + 6x) \frac{dy}{dx} + (3x^2 + 12x + 6)y = 0$  by means of the substitution  $yx^3 = z$ . CO3 K6
- 19.a. Eliminate the arbitrary functions from  $x = f(y) + \phi(z)$ . CO4 K3  
 (or)  
 19.b. Solve  $px(y^2 + z) - qy(x^2 + z) = z(x^2 - y^2)$ . CO4 K3
- 20.a. Obtain a complete integral of  $xp^2 - ypq + y^3q - y^2z = 0$  by Charpit's method. CO4 K6  
 (or)  
 20.b. Solve  $q(p - \sin x) = \cos y$ . CO4 K6

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