Model Question Paper

Differential Equations - Part IV

12th Standard

Maths

Reg.No. : | | | | | | |

I.Answer all questions.

II.Use blue pen only.

Time : 01:00:00 Hrs

Total Marks : 80

Section-A

5 x 1 = 5

1) If $f'(x) = \sqrt{x}$ and $f(1) = 2$ then $f(x)$ is

(a) $-\frac{2}{3}(x\sqrt{x}+2)$ (b) $\frac{3}{2}(x\sqrt{x}+2)$ (c) $\frac{2}{3}(x\sqrt{x}+2)$ (d) $\frac{2}{3}x\,(\sqrt{x}+2)$

2) On putting y = v x, the homogeneous differential equation $x^2dy + y\,(x+y)\,dx = 0$ becomes

(a) x dv + (2v +v^2) dx = 0 (b) v dx + (2x +x^2) dv = 0 (c) v^2 dx - (x +x^2) dv = 0 (d) v dv + (2x +x^2) dx = 0

3) The integrating factor of the differential equation $\frac{dy}{dx} - y\tan x = \cos x$ is

(a) sec x (b) cos x (c) $e^{\tan x}$ (d) cot x

4) The P.I of $\left(3D^2 + D - 14\right)y = 13e^{2x}$ is

(a) $26 \quad xe^{2x}$ (b) $13 \quad xe^{2x}$ (c) $x \quad e^{2x}$ (d) $\frac{x^2}{2}e^{2x}$

5) The particular integral of the differential equation $f(D) \quad y = e^{ax}$ where f(D) = (D-a) g(D), $g(a) \neq 0$

(a) me^{ax} (b) e^{ax} / g(a) (c) g(a) e^{ax} (d) xe^{ax} / g(a)

Section-B

4 x 3 = 12

6) Solve the following: $(x^2 - yx^2)dy + (y^2 + xy^2)dx = 0$

7) Solve the following : $yx^2dx + e^{-x}dy = 0$

8) Solve the following: $(x^2 + 5x + 7)dy + \sqrt{9 + 8y - y^2}\,dx = 0$

9) Solve the following: $\frac{dy}{dx} = \sin(x+y)$

Section-C

4 x 6 = 24

10) Solve the following differential equation: $D^2y = -9\sin 3x$

11) Solve the following differential equation: $\left(D^2 + 5\right)y = cos^2x$

12) Solve the following differential equation: $\left(D^2 + 2D + 3\right)y = \sin 2x$

13) Solve the following differential equation: $\left(3D^2 + 4D + 1\right)y = 3e^{-x/3}$

Section-D

4 x 10 = 40

14) Solve: $(D^2 - 2D + 2)y = sin2x + 5$

15) Solve: $(D^2 - 5D + 6)y = sinx + 2e^{3x}$

16) a) Solve: $(D^2 + 2D + 3)y = sin2x$

(OR)

b) Solve the Differential equation: dy = x^3 dy + 3x^3ydx + secx(secx + tanx)dx

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