Mahatma Gandhi Mission's College of Engineering and Technology
Kamothe,Navi Mumbai

Branch: ALL **Academic Year: 2020-21**

Course Code: FE-C 201 Course Name: Engineering Mathematics II [Choice Based]

Assignment 2

Ques. No.	Question	Module	Level*	PI	CO
1	**Choose the correct answer from the options below:** **1. The roots of the auxiliary equation are imaginary and repeated ($m = \alpha \pm i\beta$) in the differential equation $f(D)y = 0$ then its solution is** a) $y = e^{\alpha x}(C_1 cos\beta x + C_2 sin\beta x)$ b) $y = e^{\alpha x}[(C_1 + C_2 x)\ cos\beta x + (C_3 + C_4 x)\ sin\beta x$ c) $y = e^{\alpha x}(C_1 cosh\sqrt{\beta}x + C_2 sinh\sqrt{\beta}x)$ d) $y = e^{\alpha x}[(C_1 + C_2 x)\ cosh\sqrt{\beta}x + C_3 sinh\sqrt{\beta}x]$	2	1	1.1.1	2
	2. $e^{-x}\left(c_1 \cos\sqrt{3x} + c_2 \sin\sqrt{3x}\right) + c_3 e^{2x}$ **is the general solution of** a. $\frac{d^3y}{dx^3} + 4y = 0$ b. $\frac{d^3y}{dx^3} - 8y = 0$ c. $\frac{d^3y}{dx^3} + 8y = 0$ d. $\frac{d^3y}{dx^3} - 2\frac{d^2y}{dx^2}y + \frac{dy}{dx} - 2 = 0$	2	1	1.1.1	2
	3.The D.E. whose auxiliary equation has the roots 0,-1,-1 is- a. $\frac{d^4y}{dx^4} + 4y = 0$ b. $\frac{d^3y}{dx^3} - 8y = 0$ c. $\frac{d^3y}{dx^3} + 8y = 0$ d. $\frac{d^3y}{dx^3} + 2\frac{d^2y}{dx^2}y + \frac{dy}{dx} = 0$	2	1	1.1.1	2
	4. If f(D) = $D^2 - 2, \frac{1}{f(D)}e^{2x} = \cdots$ a) $\frac{1}{4}e^{2x}$ b) $\frac{1}{2}e^{2x}$ c) $\frac{1}{-4}e^{2x}$ d) $2e^{2x}$	2	1	1.1.1	2
	5.If $f(D) = (D - a)^r \emptyset(D)$ **then** $\frac{1}{f(D)}e^{ax} = \cdots$ … …. a) $\frac{x^r}{r!}\cdot\frac{1}{\varphi(a)}e^{ax}$ b) $x.\frac{1}{\varphi(a)}e^{ax}$ c) $\frac{1}{f(a)}e^{ax}$ d) $e^{\alpha x}\frac{1}{f(D+a)}$	2	1	1.1.1	2

2	**Match the following** **A** — **B** 1. $\frac{1}{f(D)}e^{ax}$ — a) $\int \frac{y_1 X}{W}dx$ 2. $\frac{1}{f(D)}.a^x$ — b) $-\int \frac{y_2 X}{W}dx$ 3. $\frac{1}{(D^2+a^2)^2}\cos ax$ — c) $\frac{-x\,cosax}{2a}$ 4. $\frac{1}{f(D)}e^{-ax}.V$ — d) $\begin{vmatrix} y_1 & y_2 \\ y_1{'} & y_2{'} \end{vmatrix}$ 5. U (variation of parameter) — e) $\frac{1}{f(\log a)}.a^x$ 6. V (variation of parameter) — f) $e^{ax}\int e^{-ax}xdx$ 7 .W — g) $\frac{x^r}{r!}.\frac{1}{\varphi(a)}e^{ax}$ 8. $\frac{sinax}{f(D^2+a^2)}$ — h) $\frac{-x^2\,sinax}{4a^2}$ 9. $\frac{X}{(D-a)}$ — i) $e^{-ax}\frac{1}{f(D-a)}V$	2	1	1.1.1	2
3	**Fill in the blanks** 1.P.I.of $(D^2+4)y = \sin 3x\, is$ ... ... 2.P.I.of $(D^2-2D+1)y = e^x is$ ... ... 3. If the characteristic equation of the D.E. $\frac{d^2y}{dx^2}+2\alpha\frac{dy}{dx}+y=0$ Have two equal roots, then $\alpha = \cdots$....	2	1	1.1.1	2
4	**Define the following** i)Complementary function ii)Particular integral	2	1	1.1.1	2
5.	**State True or False** i) The differential equation $y'' - sinyy' + 2y = 0$ is a linear equation with constant coefficient. ii)The method of variation of parameters can be used to solve the equation $y''+e^t y'+t^2$y= sint iii)General solution of the differential equation $\frac{d^3y}{dx^3}+4y=0$ must contain four arbitrary constants.	3	2	1.1.1	3

6.	i. Solve $(D^2 - 2D + 1)y = e^x + 1$	2	2	1.1.1	2
	ii. Solve$(D^4 + 1)y = \cosh 4x . \sinh 3x$ iii. Solve:$\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = x^2 + e^x + cos2x$	2 2	2 2	1.1.1 1.1.1	2 2
	iv.Solve $(D^2 + 2)y = e^x cosx + x^2 e^{3x}$	2	2	1.1.1	2
	v. $Solve \frac{d^3y}{dt^3} + \frac{dy}{dt} = \cos t + t^2 + 3$	1	2	1.1.1	1
7	i. Solve. $(D^2 - D - 2)y = 2logx + \frac{1}{x} + \frac{1}{x^2}$	3	2	1.1.1	3
	ii. Solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = xe^x sinx$	3	2	1.1.1	3
	iii. Solve by method of variation of parameters $$\frac{d^2y}{dx^2} + y = \frac{1}{1 + sinx}$$	3	2	1.1.1	1
	iv. Solve by method of variation of parameters $$\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = e^{e^x}$$	3	2	1.1.1	1
8	i)Application of first order and first degree differential equation	2	3	1.1.1	2