GOVERNMENT COLLEGE OF ENGINEERING.
(An autonomous institute of Govt. of Maharashtra)

CT-I W-2017 SHU-301 ENGG. MATHS-III MARKS-15
TIME-1 HOUR Date-03/08/2017

Q.1 The differential equation satisfied by a beam uniformly loaded (w kg/m) with one end fixed and second end subjected to tensile force P is given by E.I. $\frac{d^2y}{dt^2} = Py - \frac{1}{2}Wx^2$ show that the elastic curve for the beam with condition y=0=$\frac{dy}{dx}$ at x=0 given by $y = \frac{w}{Pn^2}(1 - \cos hnx) + \frac{wx^2}{2P}$ where $n^2 = \frac{P}{EI}$ **(3)**

Q.2 Attempt any four :- **(12)**

a) Solve the differential equation $\frac{d^2x}{dt^2} + \frac{g}{l}x = \frac{g}{l}L$ where g,l,L are constants subject to the condition x=a , $\frac{dx}{dt} = 0 \, , at \; t = 0$

b) Solve $(D^2 + 5D + 6)y = e^{-2x}\sin 2x + 4x^2e^x$

c) Using the method of variation of parameters solve $\frac{d^2y}{dx^2} - y = (1 + \frac{1}{e^x})^{-2}$

d) Solve $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + 4y = \cos(\log x) + x\sin(\log x)$

e) Solve $(2x-1)^2y'' - 6(2x-1)y' + 16y = 8(2x-1)^2$

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GOVERNMENT COLLEGE OF ENGINEERING.
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CT-1 W-2013 SHU-301 ENGG. MATHS-III | Civil/Mech] MARKS-15 TIME-1 HOUR

Q.1 Solve the differential equation $\frac{d^2x}{dt^2}+\frac{g}{t}x=\frac{g}{l}L$ where g, l, L are constant subject to the conditions $x=a, \frac{dx}{dt}=0,\ at\ t=0$. 3

Q.2 A body executes damped forced vibrations given by the equation $\frac{d^2x}{dt^2}+2k\frac{dx}{dt}+b^2x=e^{-kt}\sin\omega t$. Solve the differential equation for both the cases when $\omega^2\neq b^2-k^2$ and when $\omega^2=b^2-k^2$ 3

Q. 3 ATTEMPT ANY THREE 9

(A) Solve $\left(D^3+1\right)y=\cos^2\left(\frac{x}{2}\right)+e^{-x}$

(B) Solve $\left(D^2+5D+6\right)y=e^{-2x}\sec^2 x\left(1+2\tan x\right)$

(C) Solve the method of variation of parameter $\left(D^2-1\right)y=\left(1+\frac{1}{e^x}\right)^{-2}$

(D) Solve $\left(3x+2\right)^2\frac{d^2y}{dx^2}+3\left(3x+2\right)\frac{dy}{dx}-36y=3x^2+4x+1$

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GOVERNMENT COLLEGE OF ENGINEERING.
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CT-I W-2017 SHU-301 ENGG. MATHS-III MARKS-15
TIME-1 HOUR Date-03/08/2017

Q.1 The differential equation satisfied by a beam uniformly loaded (w kg/m) with one end fixed and second end subjected to tensile force P is given by E.I. $\frac{d^2x}{dt^2} = Py - \frac{1}{2}Wx^2$ show that the elastic curve for the beam with condition y=0=$\frac{dy}{dx}$ at x=0 given by $y = \frac{w}{Pn^2}(1 - \cos hnx) + \frac{wx^2}{2P}$ where $n^2 = \frac{P}{EI}$ **(3)**

Q.2 Attempt any four :- **(12)**

a) Solve the differential equation $\frac{d^2x}{dt^2} + \frac{g}{l}x = \frac{g}{l}L$ where g,l,L are constants subject to the condition x=a , $\frac{dx}{dt} = 0$, $at\ t = 0$

b) Solve $(D^2 + 5D + 6)y = e^{-2x}\sin 2x + 4x^2e^x$

c) Using the method of variation of parameters solve $\frac{d^2y}{dx^2} - y = (1 + \frac{1}{e^x})^{-2}$

d) Solve $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + 4y = \cos(\log x) + x\sin(\log x)$

e) Solve $(2x-1)^2y'' - 6(2x-1)y' + 16y = 8(2x-1)^2$

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GOVERNMENT COLLEGE OF ENGINEERING.
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CT-I W-2017 SHU-301 ENGG. MATHS-III MARKS-15
TIME-1 HOUR Date-03/08/2017

Q.1 The differential equation satisfied by a beam uniformly loaded (w kg/m) with one end fixed and second end subjected to tensile force P is given by E.I. $\frac{d^2y}{dt^2} = Py - \frac{1}{2}Wx^2$ show that the elastic curve for the beam with condition y=0=$\frac{dy}{dx}$ at x=0 given by $y = \frac{w}{Pn^2}(1 - \cos hnx) + \frac{wx^2}{2P}$ where $n^2 = \frac{P}{EI}$ **(3)**

Q.2 Attempt any four :- **(12)**

a) Solve the differential equation $\frac{d^2x}{dt^2} + \frac{g}{l}x = \frac{g}{l}L$ where g,l,L are constants subject to the condition x=a , $\frac{dx}{dt} = 0$, $at\ t = 0$

b) Solve $(D^2 + 5D + 6)y = e^{-2x}\sin 2x + 4x^2e^x$

c) Using the method of variation of parameters solve $\frac{d^2y}{dx^2} - y = (1 + \frac{1}{e^x})^{-2}$

d) Solve $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + 4y = \cos(\log x) + x\sin(\log x)$

e) Solve $(2x-1)^2y'' - 6(2x-1)y' + 16y = 8(2x-1)^2$

GOVERNMENT COLLEGE OF ENGINEERING, AMRAVATI
(An autonomous institute of Govt. of Maharashtra)

CT-1 W- 2015 SHU301 [CIVIL/ MECH] ENGG.MATHS-III MARKS-15 TIME-1 HOUR

Q.1 The differential equation satisfied by a beam, uniformly loaded with one end fixed and second subjected to a tensile force P is given by $EI\frac{d^2y}{dx^2}-Py=-\frac{w}{2}x^2$ find the Elastic curve for the beam under conditions $y=0, \frac{dy}{dx}=0,$ *where* $x=0$. 3

Q.2 Solve $x^2\frac{d^2y}{dx^2}-3x\frac{dy}{dx}+y=\log x\frac{\sin(\log x)+1}{x}$. 3

Q. 3 ATTEMPT ANY THREE 9

(A) Solve $\frac{1}{8x^2}\left(\frac{d^2y}{dx^2}-4\frac{dy}{dx}+4y\right)=e^{2x}\sin 2x$

(B) Solve $\left(D^2+5D+6\right)y=e^{-2x}\sec^2 x\left(1+2\tan x\right)$

(C) Solve the method of variation of parameter $(D^3+D)y=\tan x$.

(D) Solve $\left[(3x+2)D^2+3D\right]y=\frac{3x^2+4x+36y+1}{(3x+2)}$.

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GOVERNMENT COLLEGE OF ENGINEERING, AMRAVATI
(An autonomous institute of Govt. of Maharashtra)

CT-1 [Direct-II[nd] year] W- 2015 MARKS-15 TIME-1 HOUR
SHU301,SHU303, SHU304 ENGG.MATHS-III [CIVIL/ MECH/ELPO/EXTC/CS/IT/IN]

Q.1 Using the method of variation of parameters Solve

$$\left(1+\frac{1}{e^x}\right)^2\left[\left(D^2-1\right)y\right]=1$$ 3

Q.2 Solve $y=\log x\frac{\sin(\log x)+1}{x}-x^2\frac{d^2y}{dx^2}+3x\frac{dy}{dx}$. 3

Q. 3 ATTEMPT ANY THREE 9

(A) Solve $\left(D^3+1\right)y=\cos^2\left(\frac{x}{2}\right)+e^{-x}$

(B Solve $\frac{1}{e^x}\left(\frac{d^2y}{dx^2}-2\frac{dy}{dx}+2y\right)-\tan x=0$

(C) Solve the method of variation of parameter $\frac{d^2y}{dx^2}+y=\tan x$

(D) Solve $(1+x)^2\frac{d^2y}{dx^2}+(1+x)\frac{dy}{dx}+y=2\sin\log(1+x)$

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Government College of Engineering, Amravati
(An Autonomous Institute of Government of Maharashtra)

B. TECH II (CIVIL/MECH) **CT1** **Winter 2016** **Dt: 4/08/2016** **Time 1 Hour**

SHU301 Engineering Mathematics III

1. Find the elastic curve of a uniform cantilever beam of length l, having a constant weight w pound per foot by using the differential equation $EI\frac{d^2y}{dx^2} = \frac{w}{2}(l-x)^2$ under the conditions $\frac{dy}{dx} = y = 0$.
   Also determine the deflection of the free end. (4)

2. Solve the equation by method of variation of parameters
   $\frac{d^2y}{dx^2} - 4y = e^{2x}$. (2)

Que: ATTEMPT ANY THREE : (9)

3. Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = e^{2x} + x^3 + cos2x.$

4. Solve $(3x+2)^2\frac{d^2y}{dx^2} + 3(3x+2)\frac{dy}{dx} - 36y = 3x^2 + 4x + 1.$

5. Solve $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = \sin(logx^2).$

6. Solve $\frac{d^3y}{dx^3} + 3\frac{dy}{dx} = cosh2x\ sinh3x.$

$\log x = \frac{\log_e x}{\log_e 2}$

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