Government College of Engineering, Amravati

(An Autonomous Institute of Government of Maharashtra)

CT2 SHU-201ENGG MATHS-II MARKS-15 TIME- 1 HOURS:4:30-5:30 pm Date: 21/03/2017

ATTEMPT ANY FIVE

1. A constant electromotive force E volt is applied to a circuit containing a constant resistance R ohm in series and constant inductance L henries. If the initial current is zero, show that the current builds up to half its theoretical maximum in (L log 2)/R seconds.
2. Find the orthogonal trajectory of the family of $r^2 = c^2 \sin 2\theta$.
3. Solve $(xdx + 2xdy) + (2ydx + ydy) - (3dx + 3dy) = 0$ by using reducible to homogenous.
4. Solve $x\frac{dy}{dx} = y + \cos\frac{1}{x}$.
5. Solve $(\sin x \sin y - xe^y)\, dy = (e^y + \cos x \cos y)dx$.
6. Find the value of α so that $e^{\alpha x^2}$ is an integrating factor of $x(1-y)dx - dy = 0$.

GOVERNMENT COLLEGE OF ENGINEERING, AMRAVATI
CT-II
SHU201, ENGINEERING MATHEMATICS-II

CLASS: B.TECH FIRST YEAR
Q.1 Attempt Any Five

Date-18/10/2014

Max Marks:15

a) Trace the Curve $y^2(2a-x)=x^3$ (15)

b) Evaluate $\int_0^2 x^4\left(8-x^3\right)^{\frac{-1}{3}}$ by using Beta function.

c) Verify the rule of DUIS for the integral $\int_a^{a^2} \log ax\, dx$

d) Show that $\int_0^1 \frac{x^{m-1}+x^{n-1}}{(1+x)^{m+n}}dx=\beta(m,n)$

e) Prove that $\overline{m}\left|m+\frac{1}{2}\right.=\frac{\sqrt{\pi}}{2^{2m-1}}\overline{|2m}$

f) Show that $\int_0^1 x^p(\log x)^n\,dx=\frac{(-1)^n n!}{(p+1)^{n+1}}$

GOVERNMENT COLLEGE OF ENGINEERING, AMRAVATI

CT-II SHU-201 ENGG.MATHS-II Max marks 15 TIME-1 HOUR

ATTEMP ANY FIVE :- (15)

1) Solve $\frac{dy}{dx}=\frac{y+x-2}{y-x-4}$

2) Solve $y(\log y)\,dx+(x-\log y)\,dy=0$

3) Solve $(\sin y+e^{\sin x})\,dx+\tan x.\cos y\,dy=0$

4) Solve $(y^2 e^{xy^2}+4x^3)\,dx+(2xy\,e^{xy^2}-3y^2)\,dy=0$

5) Show that the family of the curve

$$\frac{x^2}{\lambda}+\frac{y^2}{\lambda-a}=1$$ were λ is parameter,

is self orthogonal.

6) A resistance of 100 ohms, an inductance of 0.5 henry are connected in series with a battery of 20 volts. If the current is zero when t = 0, find the current in the circuit as a function of time.

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CT-2 S-2013 SHU-201 ENGG.MATHS–II [All Branches]

A. ATTEMPT ANY FOUR

1. Find the value of λ for which the differential equation
$(xy^2 + \lambda x^2 y)dx + (x+y)x^2 dy = 0$
is exact. Solve the equation for this value of λ.
2. Solve $\left\{y\left(1+\frac{1}{x}\right)+cosy\right\}dx + \{x + logx - xsiny\}dy = 0.$
3. Define homogeneous equation and Linear differential equation.
4. Solve $xy\ log\ \frac{x}{y}\ dx + \left(y^2 - x^2 log\ \frac{x}{y}\right)dy = 0$, given that $y(1) = e$.
5. Solve $\frac{dy}{dx} + \frac{y}{x} logy = \frac{y}{x^2}(logy)^2$.

B. ATTEMPT ANY TWO

6. Solve $\frac{dy}{dx} + \frac{2x+3y}{y+2} = 0.$
7. When a resistance R ohms and a capacitance C Farads are connecte with an emf E volts the current i amperes is given by $R\frac{di}{dt} + \frac{i}{C}$ $R = 1000$ ohms, $C = 50 \times 10^{-1}$ farads, $i = 10$ amperes and $t = 0$, current $t = 1$ sec and $E = 100\ sin\ 120\pi t$ volts.
8. Find orthogonal trajectories for a given family of curves $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} =$ λ is a parameter.