

JK Lakshmipat University Jaipur

INSTITUTE OF ENGINEERING AND TECHNOLOGY

Mid Term Examination-I, February, 2015

B. Tech. (All branches), Semester II



Roll No.....

MA201: Engineering Mathematics II

Time: 1.5 hours

Max. Marks: 40

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Calculators are allowed.
4. Graph papers will be provided.

Q.1A	Objective type questions (5 questions @ 1 mark)	05
i.	An ellipse have extreme points (a) 2 (b) 4 (c) 0 (d) infinite	
ii.	The necessary and sufficient condition for $Mdx + Ndy = 0$ to be exact is -	
iii.	The degree of ODE $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 = e^{x-y}$ is - (a) 2 (b) 1 (c) 0 (d) None of these	
iv.	The I.F. for a linear differential equation $\frac{dy}{dx} + Py = Q$ is	
v.	The ODE $x \sin\left(\frac{y}{x}\right) \frac{dy}{dx} = y \sin\left(\frac{y}{x}\right) + x$ is differential equation: (a) an Exact (b) Homogeneous (c) Linear (d) None of these	
Q.1B	Short answer type questions (2 questions @ 2.5 marks)	05
i.	Define : Linear Programming Problems & Slack Variables	
ii.	Solve $y(1+xy)dx + x(1-xy)dy = 0$	
Q.2A	Solve $(y + x y^2 + x^2 y^3) dx + (x - y x^2 + y^2 x^3) dy = 0$	05
Q.2B	A factory manufactures two varieties of machines A and B. Each type is made of certain metal. The factory has only 500 kg of this metal available in a day. To manufacture machine A, 20 kg of metal is required and 50 kg is required for machine B. Each machine requires 20 minute assembly time and the assembly department has only 280 minutes. Further machines A and B require 10 minutes and 5 minutes respectively to be painted. The painting department is restricted not to use more than 200 minutes in a day. The factory earns profit of Rs 1000 and Rs 2000 on machines A and B respectively. Formulate the above problem Mathematically and Show the feasible region on the graph.	05
Q.3A	Solve the following LPP by graphical method and find the optimal value of Z. <i>Minimize</i> $Z = 3x + 5y$ <i>subject to</i> $2x - y \leq 4$; $x - 2y \leq 2$; $x + y \geq 3$ <i>and</i> $x, y \geq 0$	05



Q.4A	Solve $x^2y dx = (x^3 + y^3) dy$	05
Q.4B	Solve the following LPP by Simplex method $Maximize \quad Z = 40x + 35y$ $subject \ to \quad 2x + 3y \leq 60$ $4x + 3y \leq 96$ $and \quad x \geq 0, y \geq 0$	10
	OR	
Q.4B	Solve the following differential equations (i) $(2x^2y^2 + y) dx - (3x - x^3y) dy = 0$ (ii) $y(x^2y + e^x) dx = e^x dy$	10

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