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THIRD SEMESTER **B. Tech (ME)**

SUPLEMENTARY EXAMINATION **FEBURARY 2019**

ME-207 ENGINEERING ANALYSIS AND DESIGN

Time: 3 Hours Max. Marks: 40

Note: Attempt five questions in all. Question 1 is compulsory.
Each question carries equal marks.
Statistical table is allowed.
Assume missing data , if any

1. Write short notes on the following:
   (a) Modeling of Mechanical System
   (b) Types of failure
   (c) Hypothesis testing
   (d) Computer aided engineering analysis

2 (a) What do you understand by engineering analysis? Discuss the steps followed in an Engineering Design processes.
   (b) Describe the important Ethical issues involved in the course of operating a business.

3 (a) Briefly discuss about Technical Report writing. Structure wise, what are the important parts of a Technical Report.
   (b) What are the important steps followed while preparing a Presentation?

4 (a) Describe the different Theories of Failure with neat diagram.
   (b) Design a cylindrical solid shaft made of Steel, for which the Maximum Normal stress should not exceed 140 N / mm^2 and its Maximum allowable Shear stress is 65 N / mm^2 . The shaft is being operated by an Engine of 760 kw, running at 1400 rpm. Shaft is mounted by a Pulley over it, which is creating maximum bending moment of 3.5 kNm.

5 (a) Solve the following linear programming problem-

Maximize $Z= 2x_1+x_2+x_3$

Subjected to: $4x_1+6x_2+3x_3 \leq 8$

$3x_1 -6x_2 -4x_3 \leq 1$

$2x_1 +3x_2 -5x_3 \geq 4$

x_1, x_2 and $x_3 \geq 0$

(b) A company manufactures two kind of machines, each requiring a different manufacturing techniques. The Deluxe machine requires 18 hours of labour, 9 hours of testing, and yield a profit of Rs 400. The Standard machine requires 3 hours of labour, 4 hours of testing, and yields a profit of Rs 200. There are 800 hours of labour and 600 hours of testing available each month. A marketing forecast has shown that the monthly demand for the Standard machine to be no more than 250. The management wants to know the number of each model to produce monthly that will maximize the total profit.

6 (a) A manufacturing firm has three plants at the locations A, B, C which supply to warehouses which are located at D, E, F, G, and H. Monthly plant capacities are 800, 500 and 900 units respectively. Monthly warehouses requirements are 400, 400, 500, 400 and 800 units respectively. Unit transportation cost (in Rs) are given below. Determine an optimum distribution for the company in order to minimize the total transportation cost.

P.T.O

		To				
		D	E	F	G	H
From	A	5	8	6	6	3
	B	4	7	7	6	5
	C	8	4	6	6	4

(b) Solve the assignment problem represented by the matrix.

	1	2	3	4	5	6
A	9	22	58	11	19	27
B	43	78	72	50	63	48
C	41	28	91	37	45	33
D	74	42	27	49	39	32
E	36	11	57	22	25	18
F	*3*	*56*	*53*	*31*	*17*	*28*

7 (a) What do you understand by Poisson distribution. Derive the relationship for its mean and variance.

(b) An electrical firm manufactures lightbulbs that have a life, before burn out, that is normally distributed with mean equal to 800 hours and a standard deviation of 40 hours. find the probability that a bulb burns between 778 and 834 hours.

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