Printed Pages – 4

TME – 802

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0481 Roll No. | | | | | | | | | | |

B.Tech.

(SEM VIII) EVEN SEMESTER THEORY EXAMINATION, 2009-2010

MECHANICAL SYSTEM DESIGN

Time : 3 Hours *Total Marks : 100*

Note : *(i) Attempt **all** questions.*

*(ii) All questions carry **equal** marks.*

*(iii) Be **precise** in your answer.*

(iv) Assume missing data, if any.

1. Attempt **any two** parts of the following : **(2x10=20)**

(a) Explain in brief with suitable example (***any two***) :

(i) System approach.

(ii) Concurrent engineering and its application.

(iii) Application of system concepts in engineering.

(b) Why it is important to analyze need statement ? Write types of need and need statements for :

(i) Computer

(ii) Refrigerator

(iii) Calculator

(c) The surfaces of a plane wall of thickness L are maintained at temperature t_1 and t_2. The thermal conductivity of wall material varies according to the relation : $k = k_0 t^2$.

(i) Derive an expression to find the steady state conduction through the wall.

(ii) Find the temperature at which mean thermal conductivity be evaluated in order to get the same heat flow by its substitution in the simplified Fourier's equation.

2. Attempt **any two** parts of the following : **(2x10=20)**

(a) Explain the decision process approach for systems analysis.

(b) Explain what is meant by system analysis ? List and explain the important types of models used in manufacturing systems analysis/design.

(c) A bar of gold is in thermal contact with a bar of silver of the same length and area. One end of the compound bar is maintained at 78°C and the opposite end is at 27°C. When the heat flow reaches steady state, find the temperature at the junction. The thermal conductivity of gold is 307 W/(m°C), and the thermal conductivity of silver is 417 W/(m°C).

3. Attempt **any two** parts of the following : **(2x10=20)**

(a) (i) Discuss the graphical model in system design.

(ii) The project activities, precedence relationships and durations are described in the table given below. Find critical path of the project.

Activity	Precedence	Duration (in days)
P	-	4
Q	-	5
R	P	6
S	Q	6
T	R, S	8
U	R, S	6
V	T	3
W	U	11

(b) What is subjective optimization ? What is the role of human user in it ?

(c) What do you understand by Aluminium Extrusion system ? Explain it with suitable example.

4. Attempt **any two** parts of the following : **(2x10=20)**

(a) With suitable example, write short note on :
(i) Present worth method.
(ii) Annual worth method.

(b) Calculate the height of a right circular cone of largest volume that can be enclosed by a sphere of R radius.

(c) With neat sketch, explain the Insulation system. Derive the critical thickness of Insulation of sphere.

Attempt **any two** parts of the following : **(2x10=20)**

(a) Explain what is meant by conditional probability. Give an example of a situation where you would use knowledge of conditional probability.

(b) Define simulation. Simulate the followings for 10 days and also find out the average demand per day.

Daily demand	0	10	20	30	40	50
Probability	0.01	0.20	0.15	0.50	0.12	0.02

Random number : 40, 19, 87, 83, 73, 84, 29, 09, 02, 20.

(c) Discuss the basic steps in the installation of Machinery.

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