

**M. TECH.-II (MECHANICAL CAD/CAM) (CBCS – 2015
COURSE) : SUMMER - 2018**

SUBJECT : OPTIMIZATION FOR ENGINEERING DESIGN

Day : **Monday**

Date : **18/06/2018**

S-2018-3013

Time : **11.00 AM TO 02.00 PM**

Max. Marks : 60

N.B.:

- 1) All questions are **compulsory**.
- 2) Figures to the **right** indicate **full** marks.
- 3) Both the sections should be written in **separate** answerbook.
- 4) Use of non programmable calculator.
- 5) Assume suitable data.

SECTION – I

Q.1 Explain the flowchart for optimum design procedure. **(10)**

OR

Determine the objective function for building a minimum cost cylindrical refrigeration tank of volume 50m^3 , if the circular ends cost Rs. 10 per m^2 , the cylindrical wall costs Rs. 6 per mm^2 and it costs Rs. 80 per m^2 to refrigerate over the useful life.

Q.2 Explain the optimality criteria in detail. **(10)**

OR

Consider the following function

$$U = \frac{204,165.5}{330 - 2T} + \frac{10,400}{T - 20}$$

The variable T is restricted between 40°C and 90°C . Solve by bisection method.

Q.3 Discuss optimality criteria for multivariable optimization. **(10)**

OR

Find the minimum of $f(x) = 8x_1^2 + 4x_1x_2 + 5x_2^2$
from $x^{(0)} = [-4, -4]^T$

SECTION – II

Q.4 Discuss necessary condition for optimality in constrained optimization. **(10)**

OR

Consider

$$\begin{aligned} &\text{minimize } 2x_1 + x_2 \\ &\text{subject to } x_1^2 + x_2^2 - 1 = 0 \end{aligned}$$

Q.5 Explain integer programming. **(10)**

OR

Minimize $f(x) = (x_1 - 4)^2 + (x_2 - 4)^2$
Subject to $h(x) = x_1 + x_2 - 5 = 0$

Q.6 Explain genetic algorithm. **(10)**

OR

Explain simulated annealing method.

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