

M. Tech.-II (Mechanical CAD/CAM) (CBCS – 2015 Course) :
SUMMER - 2019

SUBJECT : OPTIMIZATION FOR ENGINEERING DESIGN

Day : Tuesday
Date : 11/06/2019

S-2019-3416

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) Answer to both the sections should be written in **SAME** Answer book.
- 4) Use of non programmable calculator.
- 5) Assume suitable data.

SECTION – I

Q.1 Write short note on constraints and objective function. **(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 region elimination method with algorithm. **(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 Newton Secant method.

Q.3 Explain steepest descent method. **(10)**

OR

Consider the function

$$f(x) = 2x_1^2 + 4x_1x_2^3 - 10x_1x_2 + x_2^2$$

Find the stationary points and classify them.

SECTION – II

Q.4 Explain Lagrangian duality theory. **(10)**

OR

Maximize $f(x) = x_1 + x_2$
Subject to $x_1^2 + x_2^2 = 1$

Q.5 Discuss geometric programming **(10)**

OR

Minimize $x_1^{-2}x_2$
Subject to $2x_1x_2 + x_1^2 \leq 1$

Q.6 Explain steepest descent with reference to nontraditional optimization. **(10)**

OR

Explain genetic algorithm.

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