Unit 14 - Week 12

Assignment 12

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-12-09, 23:59 IST.

1) *1 point*

Select the correct option:

I. A real symmetric matrix A is positive definite if leading principal sub-matrices of A have only positive determinants.
II. A real symmetric matrix A is negative definite if leading principal sub-matrices of A have only negative determinants.

(a) Only statement – I is true
(b) Only statement-II is true
(c) Both the statements are true
(d) Both the statements are false

a
b
c
d

No, the answer is incorrect
Score: 0
Accepted Answers:
a

2) *1 point*

Select the correct option:

I. A real symmetric matrix A is positive definite if A has only positive eigenvalues.
II. A real symmetric matrix A is negative definite if A has only negative eigenvalues.
III. A real symmetric matrix A is indefinite if the eigenvalues of A are either zero or positive.

(a) Only statement – I and statement-II are true
(b) Only statement-II and statement-III are true
(c) Only statement-I and statement-III are true
(d) All the statements are true

a
b
c
d

No, the answer is incorrect
Score: 0
Accepted Answers:
a

3) *1 point*

Use Lagrange Multiplier method to solve the following equality constrained optimization problem.

Maximize $f = (x + y)$
subject to $x^2 + y^2 = 32$

The maximum value of f is

(a) 4
(b) 8
(c) -8
(d) 16

a
b
c
d

No, the answer is incorrect
Score: 0
Accepted Answers:
b

4) *1 point*

Select the correct option:

I. In continuous processing, the tasks that are assigned to equipment items remains fixed in time.
II. In batch processing, the tasks that are assigned to equipment items remains fixed only for a specific interval of time.
III. A Gantt chart is a tabular representations used to illustrate a series of tasks (rows) that occur over a period of time (columns).

(a) Only statement – I and statement-II are true
(b) Only statement-II and statement-III are true
(c) Only statement-I and statement-III are true
(d) All the statements are true

a
b
c
d

No, the answer is incorrect
Score: 0
Accepted Answers:
d

5) *1 point*

Solve the following Linear Programming Problem graphically.

$$\text{Maximize } Z = 250x + 75y$$
$$\text{Subject to: } 5x + y \le 100$$
$$x + y \le 60$$
$$x \ge 0,\ y \ge 0$$

The maximum value of the objective function (Z) is

(a) 4500
(b) 5500
(c) 6250
(d) 7200

a
b
c
d

No, the answer is incorrect
Score: 0
Accepted Answers:
c

6) *1 point*

The total cost (in Rs.) associated with the production of 'X' units of an item is given by

$$C(X) = 13X^2 + 48X + 36$$

Which one of the following is the sufficient condition for the total cost to be maximum?

(a) $\frac{dC(X)}{dX} = 0$ and $\frac{d^2C(X)}{dX^2} < 0$
(b) $\frac{dC(X)}{dX} = 0$ and $\frac{d^2C(X)}{dX^2} > 0$
(c) $\frac{dC(X)}{dX} < 0$ and $\frac{d^2C(X)}{dX^2} > 0$
(d) $\frac{dC(X)}{dX} > 0$ and $\frac{d^2C(X)}{dX^2} = 0$

a
b
c
d

No, the answer is incorrect
Score: 0
Accepted Answers:
a

7) *1 point*

A cylindrical vessel is made up of stainless steel and costs 'y' Rs. per meter square. Find the minimum cost of vessel which has volume V m^3.

(a) $(2(2\pi)^{2/3}(V)^{1/3})y$
(b) $(4(2\pi)^{2/3}(V)^{1/3})y$
(c) $(3(2\pi)^{1/3}(V)^{2/3})y$
(d) $((2\pi)^{1/3}(V)^{2/3})y$

a
b
c
d

No, the answer is incorrect
Score: 0
Accepted Answers:
c

8) *1 point*

A cylindrical storage vessel is to be designed with volume V = 64 m^3. The cost of curved shell is Rs 22 per m^2 and the top and the bottom plates costs Rs 28 per m^2. Determine the optimal diameter (in m) of the cylindrical storage vessel.
[Take $\pi = \frac{22}{7}$]

No, the answer is incorrect
Score: 0
Accepted Answers:
(Type: Range) 3.0 ,5.0

9) *1 point*

Let 'y' be the capacity (in kg/day) of a Urea producing plant. The variable cost (V) associated with this plant is a function of plant capacity and is given as:

$$V(y) = 250 + (0.8)y^2 \qquad \text{(Rs / kg of Urea produced)}$$

The fixed charges associated with the plant is Rs 15,00,000 per day. For the cost per kg of Urea to be minimum, the value of the optimal plant capacity (y) would be _____. (Answer should be rounded off to the nearest integer value)

No, the answer is incorrect
Score: 0
Accepted Answers:
(Type: Range) 95,100

10) *1 point*

For a given steam pipe installation, the fixed charges and the cost of heat loss are given as follows:

Fixed Charges (in Rs) = $(0.7)x + 25$
Cost of heat loss (in Rs) = $\frac{35}{x} + 50$

Where 'x' is the thickness of insulation (in cm). The insulation thickness (in cm) that gives the least total cost is _____.

No, the answer is incorrect
Score: 0
Accepted Answers:
(Type: Range) 6.0,8.0

1 point