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SEAT No. :

P257

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Oct.-16/B.E./Insem.-105

B.E. (Civil)

SYSTEMS APPROACH IN CIVIL ENGINEERING

(Elective - I(b)) (Semester - I) (2012 Pattern)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer any three questions.
- 2) Figures to the right side indicate full marks.
- 3) Use of Calculator is allowed.
- 4) Assume suitable data if necessary.

- Q1)** a) Differentiate between Linear Programming and Non Linear Programming. [4]
- b) Describe various models of optimizations used in Systems Approach. [6]

OR

- Q2)** a) What types of Civil Engineering problems may be optimized using Systems approach models? [4]
- b) State which of the following functions are convex or concave [6]
- i) $F(x) = x^3 + 3x^2$
 - ii) $F(x) = x^2 + \cos x$
 - iii) $F(x) = 4x - x^2 - 2x^3$

- Q3)** a) State the algorithm used for Newtons method. [4]
- b) Maximize using Fibonacci Method
- $F(x) = x^3 (12 - x)$ in the range (0, 12) within accuracy 10% Carry out first two iterations. [6]

OR

- Q4)** a) Explain steps followed in Dichotomous Search technique. [4]
- b) Use Lagrangian Multiplier technique to minimize [6]
- $$Z = 2x_1^3 - 3x_1^2 + 18x_2$$
- Subject to $2x_1 + x_2 = 8$
- $$x_1, x_2 \geq 0$$

P.T.O.

Q5) a) A farmer produces around 499 kg onions. Depending upon availability of raw material and climatic conditions, monthly production has been varying from 496 kgs to 504 kgs. The probability distribution is as given below. [6]

prod/mth	496	497	498	499	500	501	502	503	504
prob	0.05	0.09	0.12	0.14	0.20	0.15	0.11	0.08	0.06

Finished products are transported in container that can accommodate only 500 kgs of onions. Use following random numbers to simulate the process 82,89,78,24,53,61,18,45,04,23,50,77,27,54,10

find out

- i) What will be the average onions (in kgs) remain with farmer?
- ii) What will be the empty space in container?

b) What is the significance of using random variables while solving simulation problems? [4]

OR

Q6) a) Find the sequence that minimizes total time in hours required to complete following task in order M1 – M2 – M3. Calculate total elapsed time [6]

	Tasks						
machine	A	B	C	D	E	F	G
M1	3	8	7	4	9	8	7
M2	4	3	2	5	1	4	3
M3	6	7	5	11	5	6	12

b) What is queuing model? Explain its applications in construction field.[4]

