

SECTION-1 ATTEMPT ANY THREE

Q-1 (A) State the general rules for formulating a dual LPP problem from its primal. (7)

(B) Convert the following primal LPP in its dual problem. (7)

$$\text{Maximize } Z = 2x + 3y + 4z$$

$$\text{s.t.c. } 3x + y + 4z \leq 600$$

$$2x + 4y + 2z \geq 480$$

$$2x + 3y + 3z = 540$$

Where, $x, y, z \geq 0$.

Q-2 (A) Explain the primal-dual construction relationship. (7)

(B) Discuss algorithm of revised simplex method. (7)

Q-3 (A) Explain Johnson's algorithm for sequencing problem. (7)

(B) There are 5 jobs each of which is to be proceed through two machines (7)

A and B in the order processing are as follows.

Job	1	2	3	4	5
Machine A	3	8	5	7	4
Machine B	4	10	6	5	8

Determine the optimum sequence for 5 jobs and minimum elapsed time. Also find the idle time of machine A and B.

Q-4 (A) Write a short note on the sequencing decision problem for n jobs through m machines. (7)

(B) What is sequencing problem? Explain the principal assumptions made while dealing with sequencing problem. (7)

Q-5 (A) What is replacement problem? Explain different types of failures. (7)

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- (B) The cost price of a machine is Rs. 5000. Its maintenance cost and scrap value at the end of each year is given as follows. When should the machine be replaced? (7)

year	1	2	3	4	5	6	7	8
Maintenance cost in Rs.	1500	1600	1800	2100	2500	2900	3400	4000
Scrap value in Rs.	3500	2500	1700	1200	800	500	500	500

- Q-6 (A) The cost price of an item is Rs. 7000. Annual operating cost is Rs. 300 for the first year and then increases by Rs. 1500 every year. After how many years should the item be replaced? (7)
- (B) Explain the theorem of replacement policy for items whose running cost increases with time and value of money remains constant when time 't' is a continuous variable. (7)

SECTION-II ATTEMPT ANY EIGHT

(8)

Q-7 (1) The value of _____ remains constant in replacement problem.

- (a) money
- (b) maintenance cost
- (c) scrap value
- (d) resale value

(2) The maintenance cost of an item _____ with time in replacement problem.

- (a) increase
- (b) decrease
- (c) remains unchanged
- (d) Both (a) and (b)

(3) In context of duality, the complementary LPP is called as _____.

- (a) Primal
- (b) Standard
- (c) Dual
- (d) Simple

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- (4) In replacement problem, $\sum f(t) =$
 - (a) Accumulated maintenance cost
 - (b) Total maintenance cost
 - (c) *Total accumulated maintenance cost*
 - (d) None of the above
- (5) Feasible solution of the LPP satisfies ____
 - (a) Only Non-negativity conditions
 - (b) *Non-negativity restrictions and constraints*
 - (c) constraints only
 - (d) None of the above
- (6) If there are n jobs to be performed , one at a time, on each of m machines, the possible sequence would be
 - (a) $(n!)^m$
 - (b) $(m!)^n$
 - (c) $(n)^m$
 - (d) $(m)^n$
- (7) Johnson algorithm is useful when only ____ machines are available for scheduling of many jobs.
 - (a) 1
 - (b) 2
 - (c) 3
 - (d) 4
- (8) The number of variables in the dual LPP equals number of ____ in the primal LPP.
 - (a) Non negativity restrictions
 - (b) Decision variables
 - (c) *constraints*
 - (d) None of the above
- (9) Automobile tyres is the example of ____
 - (a) *gradual failure*
 - (b) random failure
 - (c) sudden failure
 - (d) none of above
- (10) Optimal solution of the LPP satisfies
 - (a) Only Non-negativity conditions
 - (b) constraints only
 - (c) *Non-negativity restrictions, constraints and objective function*
 - (d) None of the above

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Candidate's Seat No : _____

B.Sc. Sem-6 Examination

CC 311

Statistics (A) Medical Statistics (O/N)

Time : 2-00 Hours]

April 2022

[Max. Marks : 50

Instructions

1. There are TWO SECTIONS in this question paper.
2. All questions in Section – I carry equal marks.
3. Attempt ANY THREE questions from SECTION – I.
4. SECTION – II IS COMPULSORY and carries 8 marks.
5. Figures to the right indicate full marks of the questions/sub-questions.

SECTION - I

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|------|-----|---|---|
| Q.1 | (a) | With respect to population, explain, population growth and discrete population growth. | 7 |
| | (b) | State various factors that affect growth pattern of a population. | 7 |
| Q. 2 | (a) | Describe continuous time population growth model, role of Weibull distribution and its survival function. | 7 |
| | (b) | Explain, in details, Population growth, | 7 |
| Q. 3 | (a) | Discuss interpretation of odds ratio. | 7 |
| | (b) | Describe, in brief, epidemiology | 7 |
| Q. 4 | (a) | Explain risk ratio and give its formula. | 7 |
| | (b) | Explain, in details, Simpson's paradox. | 7 |
| Q. 5 | (a) | Describe term: "Clinical Trials" In how many phases, clinical studies are carried out? State importance of first phase of clinical trials.. | 7 |
| | (b) | Give, in brief, general history of drug discovery. | 7 |
| Q. 6 | (a) | Write a note on clinical trials. | 7 |
| | (b) | Answer the following: | 7 |
| | | (1) What is evidence based design? | |
| | | (2) State uses of longitudinal studies. | |

SECTION -II

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|------|-----------------------|---|
| Q. 7 | Answer the following: | 8 |
| | 1 | State two uses of clinical trials. |
| | 2 | Give two advantages of epidemiology. |
| | 3 | Define relative risk, also state one use of relative risk. |
| | 4 | define birth and death rates |
| | 5 | Write a note on Exponential population growth and give its application. |
| | 6 | Define discrete population growth. |
| | 7 | What is change in population size during a fixed time? |
| | 8 | Define Hazard Rate. |

