

Reg. No. :

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M.Com. (CBCS) DEGREE EXAMINATION,
APRIL 2023.

Second Semester

Commerce – Core

QUANTITATIVE TECHNIQUES

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. How many strategical approaches does operations research have?
(a) 5 (b) 3
(c) 4 (d) 2
2. Linear programs can be solved by _____.
Methods.
(a) 2 (b) 3
(c) 4 (d) 1

3. Expansion of HAM
(a) Hybrid annuity model
(b) Hungarian Assignment Method
(c) Hybrid Assignment Method
(d) Hungarian annuity method
4. The outcome or the results are expressed in terms of _____, _____ or _____.
(a) cost, time or profits
(b) price, capital or loss
(c) loss, time capital
(d) capital price or profits
5. _____ is the hub of all the activities of any project.
(a) project manger
(b) project employee
(c) employerd
(d) profit maker
6. A project passes through a _____.
(a) memory cycle (b) simulation cycle
(c) life cycle (d) sum cycle

7. _____ is a numerical technique for conducting experiments on a digital Computer.
(a) simulation
(b) linear programming
(c) research modeling
(d) operational research
8. Simulation is a _____ and _____ technique.
(a) simple and straightforward
(b) complication and difficult
(c) easy and healthy
(d) noticing and comfortable
9. Special type of Lp is known as _____.
(a) Linear programming
(b) Ip model
(c) Transportation model
(d) Serial modal
10. In 6×6 transportation problem degeneracy will not rise if the number of allocations are
(a) 36 (b) 11
(c) > 11 (d) < 11

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing (a) or (b).

11. (a) Explain operations research.

Or

- (b) Ex-servicemen Airport Services company is considering the purchase of new vehicles for the transportation between Delhi airport and hotels in the city. There are three vehicles under consideration: station wagons, minibuses and large buses. The purchase price would be Rs. 1,45,000 for each station wagon; Rs. 2,50,000 for the minibus and Rs. 4,00,000 for large buses each. The Board of Directors has authorised a maximum amount of Rs. 50 lakhs for these purchases. Because of the heavy air travel, the new vehicles would be utilised at maximum capacity regardless of the type of vehicles purchased. The expected net annual profit would be Rs. 15,000 for the station wagon; Rs. 35,000 for the minibus and Rs. 45,000 for the large bus. The company has hired 30 new drivers for the new vehicles. They are qualified drivers for all the three types of vehicles. The maintenance department has the capacity to handle an additional 80 station

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wagons. A minibus is equivalent to 1 station wagons and each large bus equivalent to 2 station wagons in terms of their use of the maintenance department. Determine the optimal number of each type of vehicle to be purchased in order to maximise profit.

12. (a) Describe the characteristics of assignment problem.

Or

- (b) In the notification of a plan layout of a factory four new machines M_1, M_2, M_3, M_4 are to be installed in a machine shop. There are five vacant places A, B, C, D and E available. Because of the limited space, machine M_2 cannot be placed at C and M_3 cannot be placed at A. The cost of locating machine i to place j is shown below

Machines	Places				
	A	B	C	D	E
M_1	9	11	15	10	11
M_2	12	9	—	10	9
M_3	—	11	14	11	7
M_4	14	8	12	7	8

Find the optimal schedule.

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13. (a) Explain critical path in detail.

Or

(b) What are the types of network? Explain.

14. (a) What are the phases of simulation?

Or

(b) The materials manager of the firm wishes to expect the desired demand of a particular item in stock the re-order lead time. This information is need to determine how far in advance to re-order before the stock level is reduced to zero. However both lead time in days and the demand per day for the item are random variables, described by the probability distribution table.

Lead Time (days)	Probability	Demand per day	Probability (units)
1	0.5	1	0.1
2	0.3	2	0.3
3	0.2	3	0.4
		4	0.2

15. (a) The distribution of commodity of warehouses A, B, C, and D planned to three sources P, Q and R. the level of surpluses and requirements at various resources are given in the following matrix with related cost of transportation as cells of the matrix.

	P	Q	R	Surpluses
A	2	7	4	5
B	3	3	1	8
C	5	4	7	7
D	1	6	2	14
Requirements	7	9	18	34

Or

(b) Explain the characteristics of assignment problem.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing (a) or (b).

16. (a) Explain the basic definitions in simples.

Or

(b) What are the Assumptions and application of LP?

17. (a) Explain the methods of assignment problem.

Or

(b) Explain Hungarian method using flow chart.

18. (a) What are the Basic rules of network analysis?

Or

(b) How, to obtain time estimate?

19. (a) Calculate the total float, free float and independent float for the project whose activities are given below

Activity	1-2	1-3	1-5	2-3	2-4
Duration (weeks)	8	7	12	4	10

Activity	3-4	3-5	3-6	4-6	5-6
Duration (weeks)	3	5	10	7	4

Or

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(b) Based on the weather conditions and industrial development in a new industrial belt, the demand for petrol for vehicles on a new service station follows the under mentioned distribution

Weekly demand	Probability
2000 liters	0.12
3000 liters	0.23
4000 liters	0.48
5000 liters	0.17

Beginning of every week storage of petrol is 3500 liter. Simulate for 5 weeks to show the inventory at the end of the week and unsatisfied demand.

Random Nos : 23, 78, 95, 05, 29.

20. (a) The activities duration and direct activity costs are given below. The indirect cost is Rs. 3,000 per work. Obtain the crash cost and duration of the project.

Activity	Time in weeks	Cost	Cost to expedite per week
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	Normal	Crash	Normal	Crash	
1-2	2	2	3000	3000	—
2-3	4	3	4000	5000	1000

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Activity	Time in weeks		Cost		Cost to expedite per week
	Normal	Crash	Normal	Crash	
2-6	8	8	6000	6000	—
3-4	3	2	2000	3500	1500
3-5	2	2	2000	2000	—
4-6	4	3	4000	5000	1000
5-6	3	3	4000	4000	—
6-7	8	5	8000	12000	1333

Or

(b) What are the types of simulation models?
