



(Pages : 4)

D – 2850

Reg. No. :

Name :

Fifth Semester B.B.A. Degree Examination, December 2017
Career Related First Degree Programme under CBCSS
CORE COURSE : BM 1541 : QUANTITATIVE TECHNIQUE FOR
MANAGEMENT
(2015 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

I. Answer **all** questions in **one** or **two** sentences. **Each** question carries **1** mark.

- 1) What is operations research ?
- 2) What is a linear programming problem ?
- 3) What are slack variables ?
- 4) Name the mathematician who developed the simplex method for solving a linear programming problem.
- 5) What are assignment problems ?
- 6) In linear programming problem :

$$\text{Maximize } Z = 60x_1 + 40x_2$$

$$\text{Subject to } 2x_1 + x_2 \leq 60$$

$$x_1 \leq 25$$

$$x_2 \leq 35$$

$$x_1, x_2 \geq 0.$$

Convert the constraints into equalities.

- 7) State any two limitations of graphical method of solving a LPP.
- 8) What is event in a network ?
- 9) What is group replacement policy ?
- 10) What is initial basic feasible solution ?

(10×1=10 Marks)

P.T.O.

SECTION - B

II. Answer **any eight** questions **not** exceeding **one** paragraph. **Each** question carries **2** marks.

- 11) What is dummy activity ?
- 12) What is unbounded solution ?
- 13) Write a note on Vogel's approximation method.
- 14) What is critical path method ?
- 15) Explain Hungarian algorithm.
- 16) What are unbalanced transportation problems ?
- 17) What are travelling salesman problems ?
- 18) What is total float ?
- 19) Discuss the standard form of LPP.
- 20) What do you mean by crashing of project network ?
- 21) A project is expected to take 15 months along the critical path having a standard deviation of 3 months. What is the probability of completing the project on the due date, if the due date fixed is (a) 18 months and (b) 12 months ?
(Hint : For $Z = 1$, Table area = 0.3413)
- 22) What is sensitivity analysis ?

(8×2=16 Marks)

SECTION - C

II. Answer **any 6** questions **not** exceeding **one** page. **Each** question carries **4** marks.

- 23) Discuss the limitations of operations research.
- 24) What are the time estimates in the PERT calculations ?
- 25) What are the uses of Network techniques for management ?
- 26) A home resourceful decorator manufacturer two types of Lamps say A and B. Both lamps go through two technicians first a cutter and second a finisher. Lamp A requires 2 hours of the cutter's time and 1 hour of the finisher's time; Lamp B requires 1 hour of cutter's and 2 hours of finisher's time. The cutter has 104 hours and finisher has 76 hours of available time each month. Profit on the lamp A is Rs. 6.00 and on one B lamp is Rs. 11.00. Formulate a mathematical model.

27) Use the graphical method, solve the following LPP problem :

Maximize $Z = 3x_1 + 5x_2$

Subject to $x_1 + 2x_2 \leq 2000$

$x_1 + x_2 \leq 1500$

$x_2 \leq 600$

$x_1, x_2 \geq 0$

28) What are the features of operations research ?

29) Discuss about constraints in LPP.

30) Find the initial feasible solution to the following transportation problem by lowest cost entry method :

	W1	W2	W3	Available
F1	2	7	4	5
F2	3	3	1	8
F3	5	4	7	7
F4	1	6	2	14
Required	7	9	18	

31) Draw the network for the project whose activities with their relationships are given below :

A, C, D can start simultaneously; $E > B, C$; $F, G > D$; $H, I > E, F$; $J > I, G$;
 $K > H, B > A$.

(6x4=24 Marks)

SECTION – D

IV. Answer any 2 questions not exceeding four pages. Each question carries 15 marks.

32) What are the phases of operations research ?

33) Explain the application of operations research.



34) A project schedule has the following time schedule :

Activity	1-2	1-3	1-4	2-5	3-6	3-7	4-6	5-8	6-9	7-8	8-9
Duration (in months)	2	2	1	4	8	5	3	1	5	4	3

i) Construct the network diagram.

ii) Identify the critical path and find the project completion time.

35) Solve the following transportation problem :

		To					Available
		W1	W2	W3	W4	W5	
From	F1	3	4	6	8	9	20
	F2	2	10	1	5	8	30
	F3	7	11	20	40	3	15
	F4	2	1	9	14	16	13
	Required	40	6	8	18	6	

(2x15=30)

Reg. No. :

Name :

Fifth Semester B.B.A. Degree Examination, December 2018
Career Related First Degree Programme under CBCSS
Core Course : BM 1541 : QUANTITATIVE TECHNIQUE FOR
MANAGEMENT
(2015 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one** or **two** sentences. **Each** question carries 1 mark.

- 1) What is OR model ?
- 2) What is descriptive model ?
- 3) What is non-degenerate basic feasible solution ?
- 4) Why is Vogel's approximation method preferred over the other methods ?
- 5) What are surplus variables ?
- 6) Write any two uses of transportation techniques.
- 7) What is corner point ?
- 8) What is feasible solution ?
- 9) What is replacement theory ?
- 10) What is Minimum Ratio ?

(10×1=10 Marks)

SECTION – B

Answer **any eight** questions **not** exceeding **one** paragraph. **Each** question carries 2 marks.

- 11) What is pessimistic time estimates ?
- 12) What is infeasibility ?
- 13) Write the mathematical formulation of LPP.
- 14) What are the limitations of linear programming ?
- 15) How is Operations Research useful in taking management decisions ?

P.T.O.

- 16) What are unbalanced assignment problems ?
- 17) What are PERT ?
- 18) What is free float ?
- 19) Briefly explain degeneracy in transportation problem.
- 20) Write the equations to calculate the expected time for an activity, variance of an activity in PERT calculations.
- 21) Explain replacement of items that deteriorate with time.
- 22) What are the rules for constructing network diagram ?

(8×2=16 Marks)

SECTION – C

III. Answer **any 6** questions not exceeding **one** page. Each question carries **4** marks.

- 23) Discuss the difference between transportation problem and assignment problem.
- 24) Discuss objective function in LPP.
- 25) Explain the classification of OR Model on the basis of structure.
- 26) A manufacturer produces two types of models M1 and M2. Each model of the type M1 requires 4 hours of grinding and 2 hours of polishing; whereas each model of the type M2 requires 2 hours of grinding and 5 hours of polishing. The manufacturers have 2 grinders and 3 polishers. Each grinder works 40 hours a week and each polisher works for 60 hours a week. Profit on M1 model is Rs. 3.00 and on model M2 is Rs. 4.00. Whatever is produced in a week is sold in the market. How should the manufacturer allocate his production capacity to the two types of models, so that he may make the maximum profit in a week ?
- 27) Solve the following LPP by graphical method :

$$\text{Maximize } Z = 2x_1 + 3x_2$$

Subject to

$$x_1 + x_2 \leq 30$$

$$x_2 \geq 3$$

$$0 \leq x_2 \leq 12$$

$$x_1 - x_2 \geq 0$$

$$0 \leq x_1 \leq 20$$

$$x_1, x_2 \geq 0.$$

- 28) OR is the art of finding bad answers where worse exists. Comment.
- 29) Assuming that the expected time are normally distributed, find the critical path and project duration of

Activity	Days		
	To	tm	Tp
1 – 2	2	5	14
1 – 3	9	12	15
2 – 4	5	14	17
3 – 4	2	5	8
3 – 5	8	17	20
4 – 5	6	9	12

- 30) Discuss the terms : Present worth factor and discount rate.
- 31) Differentiate PERT and CPM.

(6×4=24 Marks)

SECTION – D

IV. Answer any 2 questions not exceeding four pages. Each question carries 15 marks.

- 32) Discuss significance and scope of operation research.
- 33) Solve the Linear Programming Problem.

Maximize : $Z = 7x_1 + 5x_2$

Subject to

$$x_1 + 2x_2 \leq 6$$

$$4x_1 + 3x_2 \leq 12$$

$$x_1, x_2 \geq 0.$$



- 34) Given below is the time (days) required when a particular programme is assigned to a particular programmer.

		Programmers			
		A	B	C	D
Programmes	1	12	10	8	9
	2	8	9	11	7
	3	11	14	12	10
	4	9	9	8	9

Assign the programmers to the programmes in such a way that the total computing time is least.

- 35) The following table lists the jobs of a network along their time estimates.

Job	Duration (days)		
	Optimistic	Most Likely	Pessimistic
1 - 2	3	6	15
1 - 6	2	5	14
2 - 3	6	12	30
2 - 4	2	5	8
3 - 5	5	11	17
4 - 5	3	6	15
6 - 7	3	9	27
5 - 8	1	4	7
7 - 8	4	19	28

- Draw the project network.
- Calculate the length and variance of the critical path.
- What is the approximate probability that the jobs on the critical path will be completed in 41 days ? (2×15=30 Marks)

Reg. No. :

Name :

Fifth Semester B.B.A. Degree Examination, December 2019

Career Related First Degree Programme Under CBCSS

Core Course : BM 1541 – Quantitative Techniques For Management

(2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Each question carries **1** marks

1. What you mean by the term 'Random Experiment'?
2. Define the term Linear Programming.
3. Define the term loop in transportation problem.
4. What is Goal Programming?
5. Define the term 'Float'.
6. What are mutually exclusive events?
7. What is Binomial Distribution?
8. What are equally likely events?
9. Explain PERT.
10. Define surplus variables.

(10 × 1 = 10 Marks)

SECTION – B

Answer **any Eight** questions. Each question carries **2** marks

11. Explain the characteristics of Poisson distribution.
12. What is optimization problem?
13. What do you mean by Slack?
14. Explain balanced Transportation Problem.
15. Define feasible solution and convex region.
16. What are the features of normal distribution?
17. Explain the uses of network analysis?
18. What is degeneracy in transportation problem?
19. Write a short note on Markov analysis.
20. Explain Central limit theorem.
21. What are the assumption of transportation model?
22. Mention any two limitations of critical path.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any Six** questions. Each carries **4** marks.

23. What are the applications of LPP?
24. State and prove addition theorem of probability.
25. What are the network techniques?
26. Explain the North West Corner rule of transportation problem.
27. Explain decision theories.
28. A typist typed 200 pages with 200 mistakes randomly distributed. What is the probability that a page contains at least two mistakes?
29. Construct a network diagram.

Activity	1-2	1-3	2-3	2-5	3-4	3-6	4-5	4-6	5-6	6-7
Duration	15	15	3	5	8	12	1	14	3	14

30. Explain the term:
- Optimistic time,
 - Pessimistic time
 - Most likely time
 - Expected time
31. Three coins are tossed 3000 times, Find the frequencies of the distribution of heads and tails and tabulate the results. Also calculate and Standard deviations.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each carries **15** marks

32. The following data relates to a manufacturing unit. They detected few items of with some defects in 400 shifts. Fit Poisson distribution to the data

No. of faults	0	1	2	3	4
No. of shifts	138	161	69	27	5

33. Consider the following:

Activity	Time
0-1	2
1-2	8
1-3	10
2-4	6
2-5	3
3-4	3
3-6	7
4-7	5
5-7	2
6-7	8

- Construct the network diagram.
- Find the Critical Path.

34. Explain briefly with example North – West corner rule for transportation problem?
35. Solve the following linear programming problem graphically.

Minimize $Z=3x+2y$

Subject to the constraints: $x+y \geq 8$
 $3x+5y \leq 15$
 $x \geq 0, y \geq 0$

(2 × 15 = 30 Marks)

