G 3598 (Pages : 4) Reg. No.....

Name.....

M.Com. DEGREE (C.S.S.) EXAMINATION, AUGUST 2015

Second Semester

Faculty of Commerce

OR 02 C10—OPERATIONS RESEARCH

(2012 Admission onwards)

Time : Three Hours Maximum Weight : 30

Section A

Answer any **five** *questions.*
Each question carries weight 1.

1. What is meant by modelling in Operations Research ?
2. What are the limitations of L.P.P. ?
3. Define artificial variable with an example.
4. What is replacement problem ? Give two examples.
5. What is the principle of Dominance ?
6. What do you mean by degenerancy in transportation ?
7. What is game theory ?
8. What do you mean by CPM ?

(5 × 1 = 5)

Section B

Answer any **five** *questions.*
Each question carries weight 2.

9. What is an unbalanced assignment problem ? How is it solved ?
10. How do you solve a transportation problem ? What is queuing theory ?
11. Explain the application of queuing theory ?
12. Solve the following pay-off matrix :—

$$\begin{array}{c} \\ \textit{Player B} \end{array} \begin{array}{c} \textit{Player A} \\ \begin{bmatrix} 15 & 2 & 3 \\ 6 & 5 & 7 \\ -7 & 4 & 0 \end{bmatrix} \end{array}.$$

Turn over

13. The purchase price of a machine is Rs. 3,200 and the salvage value is Rs. 200. When should it be replaced ?

Year	:	1	2	3	4	5	6	7
Running Cost	:	500	600	800	1,000	1,300	1,600	1,200

14. Solve the following game :

	Player B	
Player A	− 2	− 1
	2	− 3

15. Construct a net work for the following relationship :

Beginning event	:	A	A	B	C	C	D	E
Ending event	:	B	C	D	D	E	F	F

16. Solve the following Problem graphically :

Maximize $Z = 8x_1 + 12x_2$

$x_1 + x_2 \leq 9$

$x_1 \geq 2$

$x_2 \geq 3$

$2x + 5x_2 \leq 36$

(5 × 2 = 10)

Section C

Answer any **three** *questions.*
Each question carries a weight of 5.

17. What do you mean by operation Research models ? Explain its applicability of different models.

18. Solve the following LPP with simplex method :

Minimize $Z = 9x_1 + 10x_2$

subject to $2x_1 + 4x_2 \geq 50$

$4x_1 + 3x_2 \geq 24$

$3x_1 + 2x_2 \geq 60$

where $x_1, x_2, \ldots\ldots \geq 0$.

19. Determine the optimal transportation cost and quantities to be supplied from different factory to different markets :

Market

Factory	W_1	W_2	W_3	W_4	
F_1	11	20	7	8	50
F_2	21	16	10	12	40
F_3	8	12	18	9	70
	30	25	35	40	

20. A project schedule has the following characteristics :—

Activity	*Time*	*Activity*	*Time*
1 - 2 ...	4	5 - 6 ...	4
1 - 3 ...	1	5 - 7 ...	8
2 - 4 ...	1	6 - 8 ...	1
3 - 4 ...	1	7 - 8 ...	2
3 - 5 ...	6	8 - 10 ...	5
4 - 9 ...	5	9 - 10 ...	7

(a) Construct network diagram.

(b) Compute T_E and T_L for each event.

(c) Find EST, LST, EFT and LFT.

(d) Find critical path and project duration.

21. Solve the following assignment problem so as to minimise the cost :

Job

Workers	I	II	III	IV
A	32	26	35	38
B	27	24	26	32
C	28	22	25	34
D	10	10	16	16

22. A company wishes to launch and sale three types of perfumes : A-20,000 units B-10,000 units and C-2,000 units per month. The estimated pay-off are :

		Profits		
		A	B	C
Type of perfumes	A	250	15	10
	B	40	20	5
	C	60	25	3

Estimate which type can be chosen under maximax, minimax, maximin and Laplace method.

(3 × 5 = 15)