19P249S (Pages: 3) Name …….

Reg. No.……

SECOND SEMESTER M.Com. DEGREE EXAMINATION, APRIL 2020

(CUCSS - PG)

CC15P MC2 C09 - MANAGEMENT SCIENCE

(Commerce)

(2015 to 2018 Admissions – Supplementary/Improvement)

Time: Three Hours Maximum: 36 Weightage

Section A

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

1. What is linear programming?
2. What is degeneracy in relation to the transportation problem?
3. State three important techniques used in OR.
4. What is critical path?
5. What is the use of MODI method?
6. What do you mean by queue length?

(6 x 1 = 6 Weightage)

Section B

Answer any ***six*** questions. Each question carries 3 weightage.

7. A computer centre has got four expert programmers. The centre needs four application programs to be developed. The head of the computer centre after studying carefully the programs to be developed, estimates the computer time in minutes required by the respective experts to develop the application programs as follows. Find how assignment is to be made that will minimize the total time.

Programmers	A	B	C	D
1	120	100	80	90
2	80	90	110	70
3	110	140	120	100
4	90	90	80	90

8. An animal feed company must produce at least 200kgs of mixture consisting of ingredients X1 and X2 daily. X1 costs Rs. 3/- per Kg and X2 costs Rs. 8/- per Kg. No more than 80Kg of X1 can be used and at least 60Kg of X2 must be used. Formulate a mathematical model.

9. Draw a network diagram comprising activities A, B, C…. and K such that the following relationships are satisfied:
   a) A, B and C are the first activities of the project and can start simultaneously
   b) A precedes D
   c) B precedes E and F
   d) F and C precede G
   e) E precedes H and I
   f) D and I precede J
   g) J precedes K
   h) H, G and K are the terminal activities of the project.
10. Find the initial solution for the transportation problem by Vogel's method.

	W	W	W	S
F	2	7	4	5
F	3	3	1	8
F	5	4	7	7
F	1	6	2	1
D	7	9	1	

11. What is degeneracy in relation to the transportation problem? How degeneracy can be removed from the problem?
12. What are the different types of float in scheduling project? Explain the significance of float in scheduling projects.
13. Explain the various steps in solving the travelling salesman's problem
14. What is PERT? What kinds of decision making situations may be analysed by using PERT? How?

(6 x 3 = 18 Weightage)

Section C

Answer any ***two*** questions. Each question carries 6 weightage.

15. From the following prepare the dual and solve the dual; Minimise $Z = 400x_1 + 450x_2$

Subject to $5x_1 + 10x_2 \geq 45$

$20x_1 + 15x_2 \geq 80$

$x_1 + x_2 \geq 0$

16. A small project is composed of eight activities whose time estimates are given below;

Activity	Estimated duration (weeks)		
	Pessimistic	Most likely	Optimistic
1 -2	21	7.5	3
1-3	27	8	3
2-4	8	8	8
2-5	3.5	2	0.5
3-5	10	10	10
4-5	1.7	1	0.3
4-6	9	7.5	3
5-6	5	3	1

   a) Draw the project network and identify all paths through it.
   b) What is the expected project completion time?
   c) Find the approximate probability of completing the project no more than 4 weeks later than expected
17. Solve the following transportation problem whose cost matrix availability at each plant and requirement at each warehouse are given as follows.

	W_1	W_2	W_3	W_4	Supply
P_1	190	300	500	100	70
P_2	700	300	400	600	90
P_3	400	100	600	200	180
Requirement	50	80	70	140	

Analyse the solution by MODI Method

(2 x 6 = 12 Weightage)

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