SUBJECT CODE : 15MT/ME/OT55

B. Sc. DEGREE EXAMINATION, NOVEMBER 2018
BRANCH I - MATHEMATICS
FIFTH SEMESTER

COURSE   : **MAJOR – ELECTIVE**
PAPER   : **OPTIMIZATION TECHNIQUES**
TIME   : **3 HOURS**   **MAX. MARKS :100**

SECTION – A   **(10X2=20)**
ANSWER ALL THE QUESTIONS

1. Define slack variable.

2. Define Model.

3. Define feasible solution in Transportation Problem.

4. Define Unbalanced assignment problem.

5. Define Total elapsed time.

6. State the conditions for processing of n jobs through three machines.

7. Define saddle point.

8. Define pure strategy.

9. Define Activity.

10. Define Project.

SECTION – B   **(5X8=40)**
ANSWER ANY FIVE QUESTIONS

11. Solve graphically Maximize $Z = 100x_1 + 40x_2$
subject to $5x_1 + 2x_2 \leq 1000$, $3x_1 + 2x_2 \leq 900$, $x_1 + 2x_2 \leq 500$
$x_1, x_2 \geq 0$

12. Find IBFS for the given transportation problem by VAM rule.

From	To				supply
	21	16	25	13	**11**
	17	18	14	23	**13**
	32	27	18	41	**19**
Demand	**6**	**10**	**12**	**15**	

13. Obtain the optimal sequence that minimize the total elapsed time for the jobs given below

Job:	a	b	c	d	e	f	g	h	I
M1:	2	5	4	9	6	8	7	5	4
M2:	6	8	7	4	3	9	3	8	11

..2

14. Solve the following game $\begin{bmatrix} 2 & -1 \\ -1 & 6 \end{bmatrix}$.

15. A maintenance activities consists of eight jobs .Draw the network . find the critical path and total float for each activity.

Job:	1-2	2-3	3-4	3-7	4-5	4-7	5-6	6-7
Duration:	3	4	4	4	2	2	3	2

16. Solve the following Travelling salesman problem.

	To city				
From city	1	2	3	4	5
1	-	10	25	25	10
2	1	-	10	15	2
3	8	9	-	20	10
4	14	10	24	-	15
5	10	8	25	27	-

17. Explain the some applications of Operations research.

SECTION – C (2X20=40)
ANSWER ANY TWO QUESTIONS

18. a) Solve by Big-M method Minimize $Z = 12x_1 + 20x_2$
    subject to $6x_1 + 8x_2 \geq 100$, $7x_1 + 12x_2 \geq 120$
    $x_1 , x_2 \geq 0$

    b) Solve the given Assignment problem

	I	II	III	IV	V
A	10	5	9	18	11
B	13	9	6	12	14
C	3	2	4	4	5
D	18	9	12	17	15
E	11	6	14	19	10

19. a) There are 6 jobs each of which is to be processed through
    3 machines A,B,C in the ABC .Processing times are given Obtain
    the optimal sequence that minimizes the total elapsed time.

Job:	1	2	3	4	5	6
M1:	3	12	5	2	7	11
M2:	8	6	4	6	3	1
M3:	13	14	9	12	8	13

    b) Solve the 2x5 game graphically

Player B

Player A $\begin{bmatrix} -5 & 5 & 0 & -1 & 8 \\ 8 & -4 & -1 & 6 & -5 \end{bmatrix}$

..3

20. a) A project has the following characteristics

Activity	:	A	B	C	D	E	F	G	H	I	J	K

Preceding

Activity	:	-	-	A	B	A	B	C,D	G,F	E	H,I	J

Draw the network diagram.

b) Time estimates for the activities of a PERT network are given

activity:	1-2	1-3	1-4	2-5	3-5	4-6	5-6
t_0:	1	1	2	1	2	2	3
t_m:	1	4	2	1	5	5	6
t_p:	7	7	8	1	14	8	15

  i) Draw the network

 ii) Find the expected project length

iii) find variance and Standard deviation for the project length

iv) What is the probability that the project will be completed

   a) atleast 4 weeks earlier than expected time?

   b) no more than 4 weeks later than expected time?

⅄⅄⅄⅄⅄⅄⅄