B.B.A. DEGREE EXAMINATION,NOVEMBER 2018
I Year II Semester
Allied Paper II
BUSINESS MATHS AND OPERATIONS RESEARCH

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. What is Present Value?
2. Define Probability.
3. What is a slack variable?
4. Write short notes on PERT.
5. What is an unbalanced transportation problem?
6. What is an assignment model?
7. State Baye's Theorem
8. Find the simple interest and compound interest (compounded halfyearly) Rs.10,000 @ 8% for 6 Years
9. Find the present value for annuity consisting of annual payments of Rs. 1,000 for 5 years @ 10% p.a
10. Draw the network diagram

    A <C,D, I B< G, F D < G, F F<H, K,G H < J I, J, K <E
11. A Coin is tossed three times, what is the probability of getting (a) 2 Heads (b) atleast 2 heads
12. A dice is rolled twice, what is probability of getting a difference of 2 points?

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Saina deposited Rs.1,00,000 in a bank for three years. If the rate of Interest is 7% p.a compounded quarterly, calculate the interest and amount payable after 4 years. Would it make any difference if the interest is compounded quarterly? Explain
14. Two dice are thrown simultaneously. Find the probability that the sum of points on the two dice would be 7 or more.
15. A number is selected at random from the first 1000 natural numbers. What is the probability that it would be multiple of 5 or 9?

16. Solve the following transportation problem using VAM

	1	2	3	Supply
A	5	1	2	8
B	8	9	9	26
C	2	5	8	15
D	8	1	4	13
Demand	23	16	23	62

17. A dealer wishes to purchase a number of fans and sewing machines. He has only Rs. 5760 to invest and has space for almost 20 items. A fan costs him Rs. 360 and a sewing machine Rs. 240. His expectation is that he can sell a fair at profit of Rs. 22 & a sewing machine at a profit of Rs. 18 and believes that he can sell all the items that he can buy, how should he invest his money in order to maximize his profit. Formulate the L.P.P.

18. Four Jobs can be processed on four different machines, one job on one machine. Resulting times in minutes vary with assignments. They are given below:

	Machines			
Jobs	A	B	C	D
I	42	35	28	21
II	30	25	20	15
III	30	25	20	15
IV	24	20	16	12

Find the Optimum assignment of jobs to machines and the corresponding time.

19. The following table gives the activities in a construction project and other relevant information.

Activity	A	B	C	D	E	F
Duration (Days)	6	8	4	9	2	7
Preceding Activity	–	A	A	B	C	D

Find the critical path and the project duration

Section C $(2 \times 15 = 30)$ Marks

Answer any **TWO** questions

20. Consider a problem of assigning four clerks to four tasks. The times (hours) required to complete the tasks are given below :

Tasks Clerks	A	B	C	D
1	4	7	5	6
2	-	8	7	4
3	3	-	5	3
4	6	6	4	2

Clerk 2 cannot be assigned to task A and clerk 3 cannot be assigned to task B. Find the optimum assignment schedules.

21. Consider the following project whose activities along with PERT time estimates, the optimistic time (a), most likely time (m) and the pessimistic time (b) and given as follows.

Activity	a (days)	m (days)	b (days)
1 – 2	3	6	15
7 – 8	4	19	28
2 – 3	6	12	30
3 – 5	5	11	17
5 – 8	1	4	7
6 – 7	3	9	27
4 – 5	3	6	15
2 – 4	2	5	8
1 – 6	2	5	14

Construct the network diagram and find the critical path. Determine the project completion time and its variance.

22. Solve the given LPP by simplex method

Maximize $Z = 300x_1 + 200x_2$

subject to $5x_1 + 2x_2 \leq 180$

$3x_1 + 3x_2 \leq 135$

$x_1, x_2 > 0$

23. A Committee of 7 members is to be formed from a group consisting of 8 gentlemen and 5 ladies. What is the probability that the committee would comprise

(a) 2 Ladies (b) 4 ladies and 3 gentlemen (c) 6 Gentlemen

(d) atleast 1 gentlemen (e) atleast 2 ladies