PN-010-001610 Seat No. _____

B. B. A. (Sem. VI) (CBCS) Examination

July - 2018

610 : Operation Research - 02

(New Course)

Faculty Code : 010
Subject Code : 001610

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) Attempt all **five** questions.
(2) Each question carries **equal** marks.
(3) Figures to the **right** indicate marks.

1 (a) Define O.R. and discuss essential features of O.R. **7**

(b) Explain the applications of O.R. **7**

OR

1 (a) Explain the techniques of O.R. **7**

(b) Explain the methodology of O.R. **7**

2 (a) Discuss the algorithm for processing n jobs through two machines. **7**

(b) We have six jobs each of which must be processed on the two machines A and B in the order AB. Processing times in hours are given in the table below : **7**

Job :	1	2	3	4	5	6
M_A :	3	12	5	2	9	11
M_B :	8	10	9	6	3	1

Find the optimum sequence. The total minimum elapsed time and idle time for each machine.

OR

2 Determine the optimal sequence of jobs that minimize the total elapsed time based on the following information. The processing time on machine is given in hours and passing is not allowed. Also calculate idle time on each machine : **14**

Job :		J_1	J_2	J_3	J_4	J_5	J_6	J_7
	A :	3	8	7	4	9	8	7
Machines	B :	4	3	2	5	1	4	3
	C :	6	7	5	11	5	6	12

3 (a) Discuss replacement problem with an example. Further explain various types of failure. **7**

(b) Determine the optimum replacement interval of an equipment which cost Rs. 7000 and whose resale values and running costs are as follows : **7**

Year :	1	2	3	4	5	6	7	8
Running cost (Rs.) :	2000	2100	2300	2600	3000	3500	4100	4600
Resale value (Rs.) :	4000	3000	2200	1600	1400	700	700	700

OR

3 A piece of equipment costs Rs. 7,500 initially and requires Rs. 400 to be spent on its maintenance in the first year. The maintenance cost would increase by Rs. 500 per year in each of the subsequent years. Determine the optimal replacement for the machine when (i) future costs are not discounted and (ii) future cost are discounted at the rate of 10% p.a. **14**

4 (a) Write note on Critical Path method. **7**

(b) The following table gives the activities in a construction project and other relevant information : **7**

Activity :	1-2	1-3	1-4	2-3	2-6	3-5	4-5	4-6	5-6
Duration :	8	10	8	10	16	17	18	14	9

(i) Draw the network for the project.

(ii) Find critical path and compute the expected completion time.

(iii) Find total float for each activity.

OR

4 A project has the following activities and other characteristics : **14**

Activity :	A	B	C	D	E	F	G	H	I
Preceding Activity :	-	A	A	B	B	C	E	D, F	G, H
T_o :	4	5	4	15	10	8	4	1	6
Time estimates (days) T_m :	6	7	8	20	18	9	8	2	7
T_p :	8	15	12	25	26	16	12	3	8

(i) Draw the PERT network diagram.

(ii) Determine the critical path and compute the expected project completion time.

(iii) Determine the probability of completing the project in 55 days.

5 (a) What is Inventory Management ? Explain in detail. **7**

(b) A manufacturer has to supply his customers with 600 units of his product per year. Shortages are not allowed and storage cost amounts to 60 paisa per unit per year. The set up cost per run in Rs. 80. **7**
Find :

(i) EOQ

(ii) Minimum yearly average cost

(iii) Optimum number of orders per year

(iv) Optimum period of supply per order.

OR

5 (a) Explain the Economic Order Quantity. **7**

(b) A company's product has the following information : Daily Demand = 17 units, Set up cost = Rs. 100 per order, Production rate = 50 units per day. There is 10% inventory carrying charge on the item, unit cost = Rs. 80. Determine the optimum lot size and the minimum total inventory cost. **7**
