NAU-010-001610 Seat No. _____

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

March / April - 2017

610 : Operation Research-II

(New Course)

Faculty Code : 0010

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 indicates marks.

1 (a) What is meant by sequencing problem ? State the assumptions. **7**

(b) In the machine shop, 8 different products are being manufactured each requiring time on two machines A and B as given below. **7**

Product :	1	2	3	4	5	6	7	8
A	30	45	15	20	80	120	65	10
Machines B	20	30	50	35	36	40	50	20

Find the optimum sequence of processing of different products in order to minimize the total manufacturing time for all the products. Also calculate idle time on each machine.

OR

1 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
A	8	9	6	12	7
Machines : B	3	2	4	5	1
C	4	5	5	1	2
D	7	5	8	9	3

2 (a) What is replacement problem ? Describe some important replacement situations and policies. **7**

(b) The data on the operating costs per year and resale prices of machine A whose purchase price is Rs. 10,000 are given below : **7**

Year	1	2	3	4	5	6	7
Operating Cost (Rs.)	1500	1900	2300	2900	3600	4500	5500
Resale Value (Rs.)	5000	2500	1250	600	400	400	400

OR

2 A manufacturer is offered two machines A and B. A is priced at Rs. 5,000 and running costs are estimated at Rs. 800 for each of the first five years increasing by Rs. 200 per year in the 6^{th} and subsequent years. Machine B which has the same capacity as A, costs Rs. 2,500 but will have running costs of Rs. 1,200 per year for six years increasing by Rs. 200 per year thereafter. If money is worth 10% per year, which machine should be purchased ? **14**

3 (a) State clearly distinction between PERT and CPM. **7**

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

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Duration	20	25	10	12	6	10

(i) Draw the network for the project.

(ii) Find critical path

(iii) Find total, free and independent floats for each activity.

OR

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

Activity	Preceeding Activity	Time Estimates (weeks)		
		T_o	T_m	T_p
A	–	4	7	16
B	–	1	5	15
C	*A*	6	12	30
D	*A*	2	5	8
E	*C*	5	11	17
F	*D*	3	6	15
G	*B*	3	6	15
H	*E,F*	1	4	7
I	*G*	4	19	28

(i) Draw the PERT network diagram
(ii) Identify the critical path.
(iii) Determine the mean project completion time.
(iv) Find the prob. that the project is completed in 36 weeks.
(v) Within how many weeks would you expect the project to be completed with 99% chance ?

4 (a) What is inventory management ? Explain in detail. 7

(b) For a Vendor's inventory management problem set up cost is Rs. 30 per order, unit cost is Rs. 2 and there is 10% inventory carrying charge, so that the optimum order quantity is 866 units. Determine

(i) Demand rate
(ii) Minimum total cost
(iii) Optimum scheduling period
(iv) Number of orders placed.

OR

4 (a) Explain different costs associated with an inventory system. 7

(b) A certain production is to be stored in a warehouse. The production rate is 5000 units per month and the demand rate is 4500 units per month. If the set up cost is Rs. 30 per order and cost of unit is Rs. 3 with a carrying charge of 15% determine the optimum order quantity and minimum total cost. 7

5 (a) What is Operation Research ? State its characteristics. 7

(b) Discuss the scope of operation research in modern management. 7

OR

5 (a) Discuss the nature and phases of O.R. 7

(b) Explain the techniques of O.R. 7