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END SEMESTER EXAM

Program : B.E. Mechatronics (Wollo University) **Max : 50 Marks**
Course : Resource Management Techniques **Time : 11.00 AM**
Course Code: SPR1307 **Sem : VI**
Batch : 2018 -2022 **Date : 24 .06.2021**

Part-A **Answer ALL the questions** **(10×2=20)**

Q.No	Questions	CO (L)
1.	Define Operation Research	1(1)
2.	State any four application of operation research.	1(2)
3.	Distinguish between non – degenerate and degenerate solution.	2(2)
4.	What is the use of MODI method?	2(1)
5.	Describe the following a) Elapsed Time b) Idle Time	3(2)
6.	What are the three main phases of a project	3(2)
7.	Describe about the Economic order quantity?	4(2)
8.	What are the types of Inventories?	4(1)
9.	What is meant by running cost?	5(1)
10.	Mention the two different types of failures in replacement.	5(2)

Part-B **Answer ALL the questions** **(3×10=30)**

Q.No	Questions	CO (L)
11.	Solve the LPP by using Graphical Method Max $Z = 3X_1 + 4X_2$ Subject to $5X_1 + 4X_2 \leq 200$ $3X_1 + 5X_2 \leq 150$ $5X_1 + 4X_2 \geq 100$ $8X_1 + 4X_2 \geq 80$ and $X_1, X_2 \geq 0$	1(4)
	(OR)	

12. Solve the transportation problem by using Vogel`s Approximation Method — 2(4)

				Supply
11	13	17	14	250
16	18	14	10	300
21	24	13	10	400
Demand 200	225	275	250	

To find Initial basic Feasible Solution (IBFS)

13. Find the sequence that minimizes the total elapsed time required to complete the following tasks on machine M1, M2 & M3. Also find the optimum sequence and idle time of each machine. — 3(4)

Job	A	B	C	D	E	F	G
M1	3	8	7	4	9	8	7
M2	4	3	2	5	1	4	3
M3	6	7	5	11	5	6	12

(OR)

14. The demand for an item in a company is 18000 units per year and the company can produce the item at a rate of 3000 units per month. The cost of set up is Rs. 500 per month and the holding cost is Rs.15 paise per month and cost of shortage is Rs.20 per month. Determine a) Economic Order Quantity b) Time between two consecutive order c) No of orders d) Minimum Average cost e) Maximum Inventory f) Manufacturing Time g) No of Shortage. — 4(4)

15. Determine at which year the machine should be replaced? — 5(4)

End of Month	1	2	3	4	5
Probability of Failure	0.10	0.30	0.55	0.85	1

The cost of replacing an individual item is Rs.1.25. The decision is made to replace all items simultaneously at fixed intervals and also replace individual items as they fail. If the cost of group replacement is 50 paise. What is the best replacement for group? Finally which replacement policy is the best?

(OR)

16. The cost of machine is Rs.6100 and its scrap value is Rs.100 for all the year. The maintenance costs found from experience are as follows:

		5(4)

Year	1	2	3	4	5	6	7	8
Maintenance Cost (Rs)	100	250	400	600	900	1200	1600	2000

Determine at which year the machine should be replaced?