Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May, 2019

Course: Operations and Materials Management **Semester: IV**
Programme: BBALLB-BIF&ITIL **CC: CLNL2017**
Time: 03 hrs. **Max. Marks: 100**
Instructions:

SECTION A

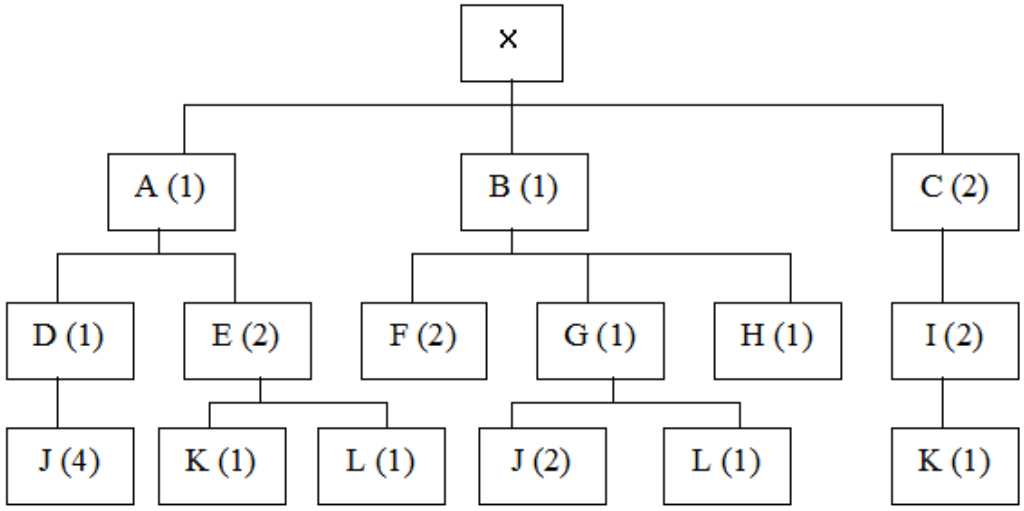
S. No.		Marks	CO
	Statement of question		
1	This is a value adding process a. Inspect b. Alter c. Transport d. All of these	**2**	**CO2**
2	Production volume in product layout is a. Low b. High c. Moderate d. Variable	**2**	**CO4**
3	A bottleneck operation is one, which has a. Lowest capacity b. Highest capacity c. Average capacity	**2**	**CO1**
4	This is a location selection model based on cost of production a. Median b. Gravity c. Factor point rating d. CVP analysis	**2**	**CO4**
5	This is an objective of plant layout a. Delay Minimisation b. Safety c. Worker convenience d. All of these	**2**	**CO4**

SECTION B

Attempt any 4 questions (each question carries 5 marks)

Q	Statement of question		
1	The total output from a plant in a shift of 10 hours is 600 units. The production norm is 75 units per hour. A total of 10 workers were employed on the day and 300 kg of steel was used for production. The cost of steel is Rs 200 per Kg and the labour wage rate is Rs 200 per labour hour. The overheads are 50% of the labour cost. Calculate a. Plant efficiency	**5**	**CO1,CO3,CO7,CO8**

	b. Material productivity c. Labour productivity d. Multi factor productivity		
2	Differentiate between level output plan and chase plan. Which plan would be preferable if a) Cost of inventory holding is very high b) Cost of production rate change is very high	**5**	**CO1,CO3,CO7,CO8**
3	How are the characteristics of manufacturing different from services?	**5**	**Co1, CO8**
4	Differentiate between a mass production, job shop and batch process with the help of suitable examples	**5**	
5	Annual demand for a component is 5000 pieces. There are three alternatives for its procurement. Option I outright purchase at ₹ 10 per piece Option II annual fixed cost of ₹ 20,000 and variable cost ₹ 2.50 per piece Option III annual fixed cost of ₹ 10,000 and variable cost ₹ 5 per piece Which option you would prefer to minimize total cost?	**5**	**CO5**
SECTION-C			
Q	Statement of question		
1	What are the constraints of MRP?	**10**	

2	The product break down structure of a product X is as follows  Calculate the quantities of E and K for producing 500 units of X	**10**	**CO1,CO3,CO7,CO8**

SECTION-D

Q	Statement of question		
1	Why is Materials Management important part of Operations Management?	**10**	**CO7**
2	How as an individual from Materials Management department would you do the vendor rating for making purchases?	**20**	**CO7**
3	Write a note on Inventory control? How is it significant?	**10**	**CO5, CO7**
4	Data for unit price and annual consumption of 8 store items is given below, Categorize the items in A, B and C categories.	**10**	**CO5, CO7**

Item	Unit price	Annual consumption
1	200	3000
2	2	60,000
3	500	20
4	12.5	200
5	9	350
6	25	6000
7	1000	40
8	70	300

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SECTION A

S. No.		Marks	CO
	Statement of question		
1	At breakeven point a. Revenue exceeds cost b. Cost exceeds revenue c. Revenue equals cost d. None of these	**2**	**CO1,CO7**
2	This is a qualitative model of forecasting a. Regression b. Exponential smoothing b. Average c. Delphi	**2**	**CO7**
3	Inventory classification on the basis of frequency of use is a. ABC b. VED b. FSN c. None of these	**2**	**CO5**
4	Processes are in sequence of operation in a. Process layout b. Product layout c. Hybrid layout d. Cellular layout	**2**	**CO4**
5	The ratio output / input denotes a. Efficiency b. Productivity c. Production rate d. None of above	**2**	**CO7**

SECTION B

Q	Statement of question		
1	The total output from a plant in a shift of 10 hours is 600 units. The production norm is 75 units per hour. A total of 10 workers were employed on the day and 300 kg of steel was used for production. The cost of steel is ₹ 200 per Kg and the labour wage rate is ₹ 200 per labour hour. The overheads are 50% of the labour cost. Calculate e. Plant efficiency b. Material productivity f. Labour productivity d. Multi factor productivity	**5**	**CO2, CO3**

2	Differentiate between product layout and process layout with suitable examples.	**5**	**CO4**
3	Annual demand for a component is 7000 pieces. There are three alternatives for its procurement. Option I outright purchase at ₹ 10 per piece Option II annual fixed cost of ₹ 20,000 and variable cost ₹ 2.50 per piece Option III annual fixed cost of ₹ 10,000 and variable cost ₹ 5 per piece Which option you would prefer to minimize total cost?	**5**	**CO5**
4	Differentiate between Forward and Backward Scheduling.	**5**	
	SECTION-C		
Q	Statement of question		
1	What are the various factors affecting inventory levels? Differentiate between QR and periodic systems of inventory control	**10**	**CO5**
2	What are the different ways Inventory is classified? Discuss the quadrant method for any two products in an industry one which stops the production other product with which the work is not stopped.	**10**	**CO5**
	SECTION-D		
Q	Statement of question **Haygood Brothers Construction** George and Harry Haygood are building contractors who specialize in the construction of private home dwellings, storage warehouses, and small businesses (less than 20,000 sq. ft. of floor space). Both George and Harry entered a carpenter union's apprenticeship program in the early 1990s and, upon completion of the apprenticeship, became skilled craftsmen in 1996. Before going into business for themselves, they worked for several local building contractors in the Detroit area. Typically, the Haygood Brothers submit competitive bids for the construction of proposed dwellings. Whenever their bids are accepted, various aspects of the construction (electrical wiring, plumbing, bricklaying, painting, and so forth) are subcontracted. George and Harry, however, perform all carpentry work. In addition, they plan and schedule all construction operations, frequently arrange interim financing, and supervise all construction activities. The philosophy under which the Haygood Brothers have always operated can be simply stated:"Time is money." Delays in construction increase the costs of interim financing and postpone the initiation of their building projects. Consequently, they deal with all bottlenecks promptly and avoid all delays whenever possible. To minimize the time consumed in a construction project, the Haygood Brothers use PERT.		**CO7, CO8**

First, all construction activities and events are itemized and properly arranged (in parallel and sequential combinations) in a network. Then time estimates for each activity are made, the expected time for completing each activity is determined, and the critical (longest) path is calculated. Finally, earliest times, latest times, and slack values are computed. Having made these calculations, George and Harry can place their resources in the critical areas to minimize the time of completing the project.

The following are the activities that constitute an upcoming project (home dwelling) of the Haygood Brothers:

1. Arrange financing (AB)
2. Let subcontracts (BC)
3. Set and pour foundations (CD)
4. Plumbing (CE)
5. Framing (DF)
6. Roofing (FG)
7. Electrical wiring (FH)
8. Installation of windows and doors (FI)
9. Ductwork and insulation (including heating and cooling units) (FJ)
10. Sheetrock, paneling, and paper hanging (JK)
11. Installation of cabinets (KL)
12. Bricking(KM)
13. Outside trim (MN)
14. Inside trim (including fixtures) (LO)
15. Painting (OP)
16. Flooring (PQ)

TABLE **1**

Haygood Brothers Construction Co.

	DAYS		
ACTIVITY	a	m	b
AB	4	5	6
BC	2	5	8
CD	5	7	9
CE	4	5	6
DF	2	4	6
FG	3	5	9
FH	4	5	6
FI	3	4	7
FJ	5	7	9
JK	10	11	12

	KL	4	6	8		
	KM	7	8	9		
	MN	4	5	10		
	LO	5	7	9		
	OP	5	6	7		
	PQ	2	3	4		
1	Draw the Network Diagram. What is the time length of the critical path?					
2	What is the significance of the critical path?					
3	Compute the amount of time that the completion of each event can be delayed without affecting the overall project.					