U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Industrial Engineering & Management **Duration: 3 hrs.**
Course Code: 22IM4PCINE **Max Marks: 100**
Course: Industrial Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT – I	CO	PO	Marks
1	a)	Define Industrial Engineering? List some of the objectives of Industrial Engineering.	CO1	PO1	05
	b)	Differentiate between Production and Productivity	CO1	PO1	05
	c)	Two workmen, Mr. Naama and Mr. Gootha, produce the same product using the material. Mr. Naama is paid bonus according to Halsey plan, while Mr. Gootha is paid bonus according to Rowan plan. The time allowed to manufacture the product is 150 hours. Mr.Naama has taken 90 hours and Mr. Gootha has taken 120 hours tocomplete the product. The normal hour rate of wages of workman Mr. Naama is Rs. 20 per hour. The total earnings of both the workersare same. Calculate the normal hour rate of wages of workman Mr. Gootha.	CO1	PO2	10
		OR			
2	a)	List and explain researchers' contributions to Industrial Engineering domain	CO1	PO1	08
	b)	Briefly discuss the approaches an Industrial Engineer would adopt in solving a problem.	CO1	PO1	04
	c)	Mr. Ramanna is currently working a total of 12 hours per day to produce 240 dolls. He thinks that by changing the paint used for the facial features and fingernails that he can increase her rate to 360 Rs per day. Total material cost for each doll is approximately Rs.3.50; he has to invest Rs.20 in the necessary supplies (expendables) per day; energy costs are assumed to be only Rs. 4.00 per day; and he thinks he should be making Rs.10 per hour for his time. Viewing this from a total (multifactor) productivity perspective, what is his productivity at present and with the new paint?	CO1	PO1	08

			UNIT – II			
	3	a)	With a neat block diagram explain the concept of total work content	***CO2***	***PO 1***	**08**
		b)	The operator engaged on the machine performs the following operations: 1. Pick up the job, place it between the jaws of a hydraulic vice (0.2 min). 2. Make the switch 'ON' to tightly hold the part (0.08 min). 3. Make the switch 'ON' start automatic cycle of the operation (0.08 min). 4. Machining of the part on auto cycle (1.5 min). 5. Wait till the vice opens automatically (0.08). 6. Pick up the machined job from the vice (0.05). 7. Keep it in the tray (0.05). Construct the multiple activity chart for the machining operation and determine the following: (i) Cycle time (ii) Utilization of Man & Machine	***CO3***	***PO 3***	**08**
		c)	Define Travel Chart and state any 4 applications of string diagram	***CO1***	***PO 1***	**04**
			OR			
	4	a)	Selecting a Food Manufacturing Plant as an illustration, explain the link between Method Study and higher Productivity.	*CO1, CO2*	*PO1, PO2*	**12**
		b)	Explain the differences between Micro Motion and Memo Motion studies and their respective importance with examples for each.	*CO1*	*PO1*	**08**
			UNIT - III			
	5	a)	Define Work sampling? Discuss the necessary steps followed in conducting work sampling study	***CO2***	***PO 1***	**06**
		b)	Explain Westing house system of rating with example.	***CO2***	***PO 1***	**06**
		c)	In a time study for a job done by a worker whose rating is 90, the data are as follows: • Observed time = 20 minutes • Personal needs allowance = 4% of Basic time • Fatigue allowance = 2.5% of Basic. time • Contingency work allowance = 2% of Basic time • Contingency delay allowance = 1% of Basic time. Find: (i) Basic time, (ii) work content, and (iii) Standard time.	***CO3***	***PO 3***	**08**
			OR			
	6	a)	Compare between Time study and work sampling	***CO3***	***PO1***	**05**
		b)	List the reasons for breaking down the operations into elements.	***CO3***	***PO1***	**05**

		c)	Mr. XYZ works as a drill press operator. A work sampling study was conducted and are as shown in table below: (i) Determine the standard time (ii) From the above table, suppose, it was found that 10% of parts produced are defective, determine the sample size by considering 95 % Confidence level with precision of 5%	***CO*** 4	***PO3***	**10**

Information	Source of Data	Data for Day Period
Total time expended by operator (working time and idle time)	Time cards	13,650 min.
Number of parts produced	Inspection Department	16,314 pieces
Working time in per cent	Work sampling	98.7%
Idle time in per cent	Work sampling	1.3%
Average Performance index	Work sampling	123.6%
Total allowances	Company time study manual	25%

		UNIT – IV			
7	a)	Explain WRMSD. List any five commonly observed MSDs in work place? Do you experience MSDs while riding two wheelers for a long distance?	***CO*** 4	***PO 3***	**10**
	b)	With a help of block diagram explain a simple Man- Machine system also discuss functions of Man elements in Man – Machine systems.	***CO*** 4	***PO 3***	**10**
		OR			
8	a)	How do stresses develop in human body of a long hours working construction labourer? List and explain its types and their consequences if left unattended.	***CO*** 4	***PO 3***	**10**
	b)	What are the effects of Fatigue in Industrial Workers? Explain. Also discuss the ways to mitigate it.	***CO*** 4	***PO 3***	**10**

			UNIT – V			
	9	a)	Write a note on design of Information Displays systems with respect to ergonomics: (i) Digital type instruments and (ii) Analogue type instruments	***CO*** 4	***PO 3***	**10**
		b)	Write short notes on: (i) Supply chain Management (ii) Enterprise resource planning (iii) Lean Manufacturing (iv) Value Engineering	***CO*** 1	***PO1***	**10**
			OR			
	10	a)	Explain the salient features of TQM in comparison with traditional approach to quality.	*CO1*	*PO1*	**06**
		b)	With an illustration explain the JIT manufacturing approaches are departure from conventional manufacturing system.	*CO1*	*PO1*	**06**
		c)	What is Value Engineering? Explain the reasons behind 'unnecessary costs' of a product.	*CO1*	*PO1*	**08**

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