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

Autonomous Institute Affiliated to VTU

February 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.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Explain when to use the productivity improvement programs. What are the main descriptive elements of the productivity improvement program?	*CO1* *CO2*	-	**10**
	b)	Modern Lumber, Inc. (MLI) produces apple crates, which it sells to growers. With the current equipment, MLI produces 240 crates per 100 logs. It currently purchases 100 logs per day, and each log requires three labor hours to process. MLI is considering the hire of a professional buyer who can buy better quality logs at the same cost. If this is the case, MLI can increase production to 260 crates per 100 logs, and the labor hours required will increase by eight hours per day (for the buyer). a. Compute the labor productivity for the current method (i.e., no buyer). b. What will the labor productivity be if MLI hires the professional buyer? Suppose that MLI spends $12 per hour for each worker who constructs the crates. The buyer, however, is paid $24 per hour. The material cost is $10 per log (regardless of who purchases them). c. Compute the multifactor productivity for the current method, using crates per dollar cost (labor +materials) as the measure. d. How does the multifactor productivity change if the professional buyer is hired?	*CO2* *CO3*	*PO2* *PO3*	**10**
		OR			
2	a)	Explain Productivity, its dimensions and its significance in assessing health of an enterprise?	*CO1*	*PO1*	**06**
	b)	Explain the two major techniques for improving productivity in an industrial setting with an illustration?	*CO1*	*PO1*	**06**

		c)	Explain work study and its components.	*CO1*	*PO1*	**08**
			UNIT - II			
	3	a)	Explain with an example the steps involved in conducting a "Method Study" examination.	*CO1* *CO2*	*PO1*	**10**
		b)	Prepare a Two hand Process Chart for an assembly of screw jack consisting of a body, cap, spindle, bolt and nut washers and tommy bar assuming suitable work place layout using principles of motion economy.	*CO3*	*PO3*	**10**
			OR			
	4	a)	Explain the term motion economy. Who originated Micro motion study?	*CO1*	-	**04**
		b)	With an example and neat sketch explain how the principles of motion economy related to design of tools and equipment.	*CO2*	*PO2*	**08**
		c)	Explain the steps for constructing the SIMO-Chart	*CO2*	*PO2*	**08**
			UNIT - III			
	5	a)	Explain the three types of stop watch in general use for time study	*CO3*	*PO3*	**06**
		b)	Explain how the preparation of time study jobs are broken down into various elements, explain any 5 elements with an example	*CO2*	*PO1*	**07**
		c)	What is work sampling? With an aid of tossing 5 coins 100 times and tossing large number of coins more than 100 times and observing them how do you arrive at describing the probability of occurrence.	*CO3*	*PO2*	**07**
			OR			
	6	a)	Explain Synthetic rating and Objective rating?	*CO2*	*PO1*	**06**
		b)	In a welding shop, a direct time study was done on a welding operation. One inexperienced industrial engineer and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.	*CO3*	*PO3*	**08**

			<table><tr><td>Cycle time (in Minutes)</td><td>No. of Times observed</td></tr><tr><td>20 24 29 32</td><td>2 1 1 1</td></tr></table> From the above statement, (a) Determine the standard time using the experienced industrial engineer's worker rating. (b) Find the standard time using the worker rating of inexperienced industrial engineer.			
		c)	Explain the MTM motion element R1C and G1C3 and if the elements takes 10.8 TMU then calculate the normal time.	*CO3*	*PO3*	**06**
			UNIT - IV			
	7	a)	With a neat sketch explain the System approach to ergonomic models.	*CO4*	*PO2*	**05**
		b)	Explain the term WRMSD. What are warning signs of WRMSD? What are the precautions and ergonomic improvement of WRMSD?	*CO4*	*PO2*	**08**
		c)	What are the long time health effects of fatigue and what are fatigue prevention terms and how the prevention of fatigue benefits the Industrial workers in the workplace?	*CO4*	*PO2*	**07**
			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)	Explain Alphanumeric displays and discuss the recommended design data for alphanumeric displays	*CO5*	*PO3*	**06**
		b)	With a neat sketch of permissible work area explain ergonomic factors considered for designing of workplace.	*CO5*	*PO3*	**06**
		c)	Explain the terms with respect to Industrial Engineering i) Total quality management ii) Enterprise resource planning iii) Supply chain and logistics management iv) Agile manufacturing	*CO5*	*PO3*	**08**

			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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