Exam Date & Time: 11-May-2024 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, APRIL/MAY 2024

WORK SYSTEM ENGINEERING AND ERGONOMICS [MIE 2227]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1) Discuss the resources at the disposal of an enterprise. (2)

A)

B) Discuss the steps in performing the complete Work study with an example. (3)

C)

The following observations were made in a Method study on an operator in charge of two machines I and II:

Description of events	Time (in min)	
	Machine I	Machine II
Cleaning and checking the finished job.	3	2
Preparing a job for machining.	2	1
Stopping and unloading the machine.	2	2
Loading and starting the machine.	4	3
Automatic processing by machine.	24	10

Draw a Man-machine chart for the best possible sequence (proposed method only). Find the percentage utilization for each resource. What will be the cost per piece if operator, machine I and machine II costs Rs 60/-, Rs 80/- and Rs 40/- per hour respectively? (5)

2) Distinguish between Flow diagram and String diagram. (3)

A)

B)

With the example of any enterprise, describe the following rating methods: (3)

(i) Skill and Effort rating

(ii) Westinghouse system of rating

(iii) Objective rating

C) With regard to Time study, discuss the eight types of elements with an example to each. (4)

3) What are Predetermined Time Standards (PTS)? What advantages do PTS systems offer over stop-watch time study? (3)

A)

B) Explain with an example, the statistical method used for the determination of sample size in Time study. (3)

C) Describe the three types of conventional Quantitative displays with sketches. (4)

4) What is meant by Micromotion study? Discuss the principles of motion economy with regard to design of tools and equipment. (3)

A)

B) What are the functions of controls? Explain any four coding methods used for the identification of controls. (3)

C) Explain the SIMO chart with a neat sketch. (4)

5) What is a system? Differentiate between mechanical system and automatic system. (2)

A)

B) List the names of any eight Therbligs along with their symbols and give an example to each. (3)

C) Calculate the Standard time from the data given below with regard to a restricted work and represent the various components in a Pump diagram.

Elements	Average observed time (in decimal units)	Rating (%)
Element A (Outside work)	170	70
Element B (Outside work)	80	110
Element C (Inside work)	120	95

(5)

Machine controlled time = 650 decimal units.
P.N.A = 15 %, F.A. = 5 %
(1 min = 100 decimal units)

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