Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B. TECH (INDUSTRIAL AND PRODUCTION ENGINEERING)

END SEMESTER MAKE-UP EXAMINATIONS, AUGUST 2021

SUBJECT: WORK SYSTEMS ENGINEERING [MME 2258]

REVISED CREDIT SYSTEM

Time: 2 Hours MAX. MARKS: 40

Instructions to Candidates:

- Answer any **FOUR FULL** questions.
- Missing data may be suitably assumed.

1A. Explain Cyclegraph and Chronocyclegraph. **(02)**

1B. List the techniques of Work measurement. Explain the steps involved in Time study. **(03)**

1C. Describe Partial productivity. Explain the factors responsible for reducing the productivity due to ineffective time. **(05)**

2A. How the Normal time and Sample size are determined in Time study? **(03)**

2B. Explain the human factor in the application of Work study. **(03)**

2C. Construct a Man-machine chart for the best sequence for the following activities performed by an operator in charge of a machine. Calculate the percentage utilization of resources. Considering the cycle time for the best sequence, compute the cost per piece if the operator costs Rs 40/- per hour and the machine costs Rs 60/- per hour respectively?

Sl.No.	Element description	Time (hour)
1	Picks up casting from the box and walks to the machine.	0.10
2	Positions and fastens casting in the machine.	0.12
3	Starts the machine and engages feed.	0.09
4	Casting is machined (unattended by the operator).	0.30
5	Stops the machine.	0.05
6	Unfastens and removes the casting.	0.12
7	Walks back to the box and deposits the casting.	0.10

(04)

3A. Explain the effects of noise and vibration on productivity. **(02)**

3B. Describe Micromotion study. List any twelve Therbligs along with their respective symbols and abbreviations. **(04)**

3C. With a neat sketch explain the components of a Pump diagram. **(04)**

4A. Distinguish between From -To chart and String diagram. **(03)**

4B. Describe the concept and procedure of Work sampling. **(03)**

4C. Discuss briefly any four Rating methods. **(04)**

5A. Explain Machine interference and Load factor. **(02)**

5B. Discuss Relaxation allowance and Special allowances. **(04)**

5C. With a neat sketch explain the Flow process chart. **(04)**

6A. Write a note on Human-machine system. **(02)**

6B. Discuss the Questioning technique used in the critical examination phase of Method study. **(03)**

6C. The following readings were obtained from stopwatch time study using Continuous method for two cycles performed by an operator.

(i) Compute the Basic time per cycle.
(ii) If P.N.A. is 15% and F.A. is 5%, compute the Standard time.
(iii) Assuming eight hours shift, find the production per shift.

Sl. No.	Elements	Cycle 1		Cycle 2	
		R	W.R	R	W.R
1	Picks up flange and positions.	90	0.15	95	2.15
2	Drills first hole and withdraws tool.	100	0.70	105	2.65
3	Rotates the flange by 120^{o}.	105	0.75	105	2.70
4	Drills second hole and withdraws tool.	95	1.20	100	3.25
5	Rotates the flange by 120^{o}.	90	1.35	90	3.32
6	Drills third hole and withdraws tool.	100	1.85	110	3.85
7	Removes flange and keeps aside.	95	2.00	95	4.10

R = Performance rating (%) W.R. = Watch reading in decimal minutes **(05)**