Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

V SEMESTER B. TECH (MECHANICAL AND INDUSTRIAL AND PRODUCTION ENGINEERING) END SEMESTER EXAMINATIONS, NOVEMBER 2018

SUBJECT: WORK SYSTEMS ENGINEERING [MME 4038]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Define Work study. Why it is valuable? **(02)**

1B. Write a note on Relaxation allowance and Special allowances. **(03)**

1C. Define Total productivity. Explain the factors responsible for reducing the productivity of an enterprise. **(05)**

2A. Explain Restricted work and Machine interference. **(02)**

2B. Define Method study. Explain the steps involved in Method study. **(03)**

2C. The following observations were made in a Method study on an operator in charge of two machines X and Y: **(05)**

Description of events	Time (in min)	
	Machine X	Machine Y
Cleaning and checking the finished job	3	2
Preparing a job for machining	2	1
Stopping and unloading the machine	4	3
Loading and starting the machine	6	4
Automatic processing by machine	26	11

Draw a Multiple activity chart for the best possible sequence. Find the percent utilization for each resource. Considering the cycle time for the best sequence, what will be the cost per piece if the operator, Machine X and Machine Y costs Rs 50/-, Rs 70/- and Rs 30/- per hour respectively?

3A. Briefly discuss the human factor in the application of work study. **(03)**

3B. Define Work sampling. Explain the procedure for Work sampling. **(03)**

3C. Explain Micromotion study. List any ten types of Therbligs along with their symbols and abbreviations. **(04)**

4A. What is Ergonomics? **(02)**

4B. Explain the principles of motion economy with regard to arrangement of the workplace and use of human body. **(04)**

4C. With a neat sketch explain the Flow process chart. **(04)**

5A. How Normal time and Standard time are computed in Time study? **(02)**

5B. Explain any three rating methods. **(03)**

5C. 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)	180	80
Element B (outside work)	70	120
Element C (inside work)	130	90

Machine controlled time = 550 decimal units.
P.N.A = 15 %, F.A. = 5 %
(1 min = 100 decimal units) **(05)**