

739**October 2017***Time – Three hours
(Maximum Marks: 75)*

- [N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory. Answer any FOUR questions from the remaining in each PART – A and PART – B
(2) Answer division (a) or division (b) of each question in PART – C.
(3) Each question carries 2 marks in PART – A, 3 marks in Part – B and 10 marks in PART – C.]*

PART – A

1. What are the advantages of generative process planning?
2. Define value engineering.
3. What is process selection?
4. What are Therbligs?
5. Define cost estimation.
6. What is performance factor?
7. List the principle elements of metal machining.
8. State the various recording techniques used in method study.

PART – B

9. What are the informations required to do process planning?
10. State the choice involved in the process selection.
11. State the principles of motion economy.
12. State the objectives of ergonomics.
13. What is the purpose of cost estimating?
14. Write the relationship between setup time and economic lot size.
15. Define cutting speed. Give the various factors on which the cutting speed depends.
16. The observed time from stop watch study of a job is 8 minutes. The rating factor is 98%. Fatigue allowance is 10%; personal allowance is 5%; process allowance is 10% and policy allowance is 15%. Determine the standard time for the job.

[Turn over...]

PART - C

17. (a) Explain the automated process planning with the help of neat sketches. State its advantages.

(Or)

(b) 2500 components are required for an assembly line. This component is available at the rate of ₹4 per piece, in the local market. If the same component is to be manufactured in the factory itself, the fixed cost will be ₹2500 and the variable cost will be ₹2 per piece. Decide whether to make or buy.

18. (a) Explain in detail the process and equipment selection procedure.

(Or)

(b) A component can be produced either by an automatic lathe or three centre lathes. Number of components made per year is 6000. The cost data for the two machines are given below.

	<u>Automatic lathe</u>	<u>Centre lathe</u> (for one no.)
Initial investment	₹2,00,000	₹50,000
Useful life	8 years	10 years
Motor power	15 HP	3 HP
Labour Charges	₹20 per hour	₹30 per hour
Time to produce 6000 Pieces	3000 hrs.	---
Time to produce 2000 Pieces in each machine	---	2900 hrs.

For both machines

Interest	= 18%
Cost of power	= ₹ 1.50 per unit
Taxes and insurance	= 8%
Maintenance - annual	= 7.5%
Depreciation	= 1% per year
Labour overhead	= 25% on labour

Which machine will you select?

19. (a) Explain briefly the various steps involved in the conduct of stop watch time study.

(Or)

(b) A job was broken into 10 elements. The observed time and the corresponding rating factors are given below.

Elements	1	2	3	4	5	6	7	8	9	10
Observed time in minute	0.8	1.0	0.7	0.8	0.7	1.0	1.1	0.9	0.8	0.7
RF in %	100	110	120	90	100	80	110	120	80	100

Calculate the standard time for the job. Assume rest allowance, process allowance and special allowance each to be 10% of the normal time.

20. (a) From the following data, calculate the total cost and selling price for a job. Direct material=₹5500; manufacturing wages=₹3000; factory overheads to manufacturing wages=100%; non-manufacturing overheads to factory cost=15% and profit on total cost=12%.

(Or)

(b) 40 forging are to be machined in four setups. Calculate the cost of production with the help of the following:

Machining time	= 12 min per forging.
Non-machining time	= 21 min per forging.
Setup time	= 45 min per setup
Tool Sharpening	= 5 min per forging
Fatigue	= 20%
Personal needs	= 5%
Tool change time	= 10 min
Tool life	= 8 hrs
Checking time	= 15 sec with 5 checks per forging
Performance factor	= 1.4
Direct labour Cost	= ₹5 per hour

21. (a) Estimate the machining time required on the shaper to complete one cut on a block 600 x 900mm, if the cutting speed is 6m per min. The return time to cutting time ratio is 1:4 and the feed is 2mm per stroke. The clearance at each end is 75mm and neglect widthwise allowance.

(Or)

(b) A 63.5mm diameter plain milling cutter having 6 teeth is used to face mill operation on an aluminium block of 180mm long and 30mm wide. The spindle speed is 1500rpm and the feed is 0.125mm per tooth per revolution. Find the cutting time.