



- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Due credit will be given to neatness and adequate dimensions.
 9. Use of non programmable calculator is permitted.
 10. Use of design data book is permitted.

1. a) Define Productivity. State the objectives and types of productivity. 7
 b) Define method study. Describe the objectives of conducting method study. 6

OR

2. a) Define Motion Study and explain different tools and methods for conducting micro motion study. 6
 b) Draw the flow process chart for welding of two metal pieces in workshop. Assume suitable data. 7

3. a) Define predetermined motion time system and Explain types of PMT's. 7
 b) Explain display of design and design of controls for workplace. 6

OR

4. a) Define Ergonomics. State its objectives. Also explain importance of human factors in Engineering. 6
 b) An industrial operation consists of Five elements with following observed times and the performance ratings. 7

Elements	Observed Time (min)	Performance Rating (%)
1	0.15	80
2	0.20	85
3	0.10	90
4	0.12	75
5	0.25	80

Assuming rest and personal allowances as 12% and contingency allowance as 4% of the basic time, Calculate standard time per piece.

5. a) Define Forecasting. Explain its need in Modern Industry. 6
 b) The sales particular of a company for 13 years of operation is furnished below. 8

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
Sales	96	116	119	127	146	145	153	158	160	165	177	190	205

- a) Fit a sample regression for the above data.
- b) Fore cast the sales for the 14th year of operation.
- c) Find trend value.

OR

