

Q.P. Code : 637402

(3 HOURS)

Total Marks : 100

- N.B:** 1) Question No. 1 is compulsory
 2) Attempt any **FOUR** questions from remaining
 3) **Figures to the right** indicate full marks
 4) Answers to questions should be **grouped & written together**

Q.1. Write Short notes on **any four** of the following:

- Process Capability
- TQM
- Business Process Re-engineering issues in ERP
- Principles of Value Engineering
- Micro-motion Study

Q.2. a) Describe the various tools and techniques of Industrial Engineering. (10)

b) Define method study. What are its objectives? Explain the procedure for carrying out method study. (10)

Q.3. a) Explain in detail why there is a need of computers in Industrial Engineering. (10)

b) Define plant layout. Explain the various types of plant layout. (10)

Q.4. a) In a capability study of a lathe used in turning a shaft to a diameter of 23.75 ± 0.1 mm, a sample of 6 consecutive pieces was taken each day for 8 days, and data were recorded as given below: (10)

Days	1	2	3	4	5	6	7	8
Mean	23.765	23.770	23.7716	23.7767	23.7717	23.7583	23.7767	23.7667
\bar{X}								
Range	0.007	0.11	0.06	0.08	0.04	0.05	0.07	0.07

Plot \bar{X} and R chart, and state whether the process is in control or not.

For a sample of size 6, take $A_2 = 0.48$, $D_4 = 2$, $D_3 = 0$, $d_2 = 2.534$.

b) What is ERP? Explain the evolution and functional architecture of an ERP. (10)

Q.5. a) Turning gear blanks on centre lathe involves the following elements. The continuous stop watch data is given. Assuming the rest and personal allowance as 13% and contingency allowance of 2%, calculate the standard time. (10)

Element	Description	Observation					Rating (%)
		1	2	3	4	5	
1	Pick and place	0.2	1.46	5.22	6.49	14.25	90
2	Approach M/c and tool	0.3	1.55	5.30	13.10	14.35	110
3	Turn diameter	1.05	2.31	6.05	13.84	15.10	100
4	Withdraw tool and stop machine	1.13	2.38	6.14	13.92	15.17	110
5	Release part and place it aside	1.28	2.54	6.29	14.06	15.32	95

Note: Element no. 5 Observation no. 2, foreign element 2.54 to 5.02
 Element no. 1 Observation no. 4, foreign element 6.49 to 12.98

TURN OVER

- b) Distinguish between any two of the following: (10)
- Value engineering and other cost reduction techniques
 - Control charts for variables and Control charts for attributes
 - Lean Manufacturing and Agile Manufacturing

Q.6. a) Define ergonomics. What do you mean by anthropometry? Give the use of anthropometric data. Explain the principles in the application of anthropometric data. (10)

- b) The task timings and precedence relationships are given below: (10)

Task	Time (min)	Preceding task
A	10	None
B	24	None
C	17	A
D	49	A
E	12	
F	14	C
G	27	B
H	9	E
I	20	F,G
J	23	D,H,I
K	36	I
L	18	J,K

- Draw the precedence diagram.
- Group the task into 5 station assembly line.
- Compute cycle time, line efficiency and balance delay?

Q.7. a) Define Value Engineering. Explain 'Functional Analysis System Technique' with respect to Value Engineering. (10)

- b) Write short notes on: (10)
- Work study and the Management
 - Work study and the Workers
 - Work study and the Supervisors.