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

3 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following:** **10**
- a) Write the meaning of the following symbols used in process chart.
- i) 
- ii) 
- b) Enlist the factors of production.
c) Define ergonomics.
d) Enlist various quality control tools. (any four)
e) Write advantages and disadvantages of ISO 9000.
f) State the various types of sampling methods. (any four)
g) State the various types of control charts.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Explain the steps to be performed while carrying out method study.
 - b) With the help of Block diagram, explain the supply chain management of the daily used product like
 - i) Milk
 - ii) Bread (any one)
 - c) Explain the types of displays in detail.
 - d) Compare quality control and inspection.
- 3. Attempt any THREE of the following:** **12**
- a) Draw the symbol and write the meaning of following therbligs.
 - i) Assemble
 - ii) Find
 - iii) Transport loaded
 - iv) Transport empty
 - b) Draw an outline process chart for change of SIM card of your mobile.
 - c) Explain the simulation and integration method of combined operations. Give one example of each.
 - d) Apply principles of ergonomics for design of control members like push buttons and knobs.
- 4. Attempt any THREE of the following:** **12**
- a) Explain following operations with one example of each
 - i) Basic operation
 - ii) Principle operation
 - iii) Auxillary operation
 - iv) Supporting operations
 - b) What is the effect of various environment factors such as temperature and noise on the efficiency of operator?
 - c) Define quality circle. State the objectives of quality circle.
 - d) Explain the concept of Man Machine System in ergonomics.
 - e) Draw an actual OC curves.

5. Attempt any TWO of the following:

12

- a) A particular activity on shop floor consist of three elements. Calculate the standard time for each activity. Total allowances are given as percentage of normal.

Elements	A	B	C
Observed Time (min)	1.20	0.50	0.80
Rating Factor (%)	80	90	75
Total Allowance (%)	22	19	20

- b) Explain how 5S principle can be effectively applied to your college library.
- c) Following are the inspection results of a castings for a shift. Draw appropriate control chart and write your conclusion.

Given data -

$$A_2 = 0.58, d_3 = 0, d_4 = 2.11$$

Time (Hrs)	7 am to 8 am	8 am to 9 am	9 am to 10 am	10 am to 11 am	11 am to 12 am	12 pm to 01 pm	01 pm to 02 pm	02 pm to 03 pm
No. of Defective casting	08	07	09	06	04	05	04	06
Casting inspected	300	350	400	400	350	375	350	320

6. Attempt any TWO of the following:

12

- a) What is acceptance sampling? Explain double sampling plan in details.
- b) Draw and explain
- Scatter diagram
 - Cause and effect diagram
 - Bar chart

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[4]

Marks

- c) Following are the inspection results of gear box assembly for 10 days. Draw proper control chart and write conclusion from chart.

Inspection results as below

Day	No. of gear box inspected	Defects found
1	20	4
2	25	3
3	22	2
4	20	3
5	25	4
6	24	2
7	20	4
8	25	3
9	22	2
10	20	3
