# 315368

**12526**

**3 Hours / 70 Marks** Seat No. | | | | | | | | |

*Instructions* – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answer with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) 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) List-out four objectives of a good plant layout.

b) Differentiate between production planning and production control. (Any two points)

c) List-out the functions involved in dispatching.

d) Indicate appropriate method study symbol for the following activities :–

i) The job being loaded into the fixture prior to machining.

ii) A worker trip to tool-crib to procure tool.

e) What is contingency allowance? Mention one example of it.

f) Define the term "Operation Research".

g) Define :–

i) Activity

ii) Event.

P.T.O.

**Marks**

**2. Attempt any THREE of the following:** **12**

a) Compare between intermittent and continuous manufacturing with respect to :–

i) Type of layout required

ii) Type of machines required

iii) Product Variety and Quantity produced

iv) Type of material handing cost involved.

b) Explain information required for effective process planning in manufacturing.

c) A manufacturing company places a semi-annual order of 24,000 units at a price of Rs. 20 per unit. Its carrying cost is 15% and the order cost is Rs. 12 per order. Calculate :–

i) EOQ

ii) No. of orders to be placed?

d) Prepare a table of questions to be asked and answered during critical examination in method study.

**3. Attempt any THREE of the following:** **12**

a) Differentiate between material requirement planning (MRP) and enterprize resource planning (ERP).

b) Briefly describe the seven types of wastes identified in the Just-in-time (JIT) manufacturing system.

c) What is performance rating? Name the various methods of performance rating.

**Marks**

d) In the network diagram shown below, the three time estimates namely pessimistic time, most likely time and optimistic times are indicated respectively. Find the critical path considering P.E.R.T. method. Also calculate earliest expected time for this path Refer Figure No. 1

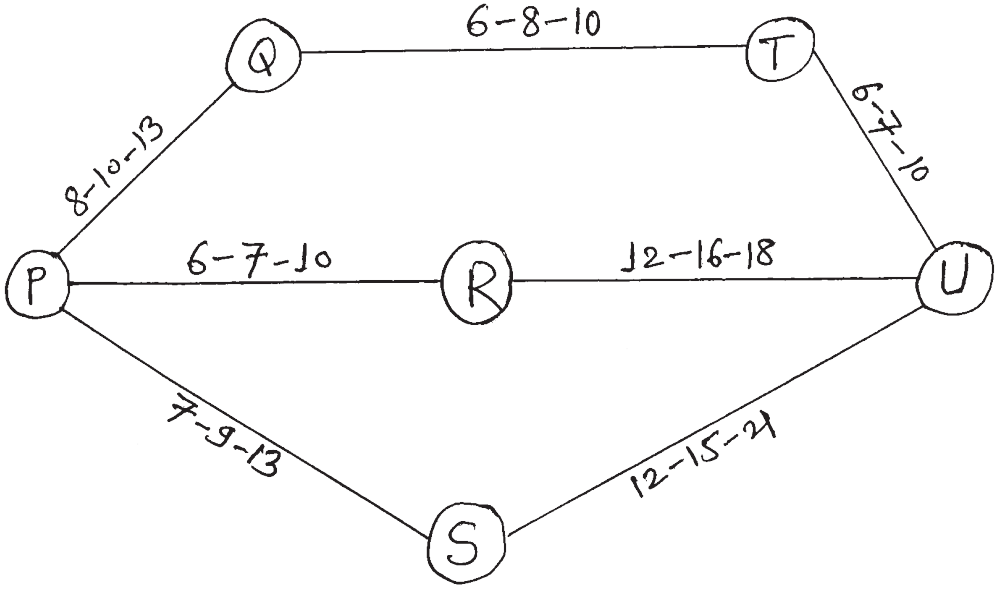


**Fig. No. 1**

**4. Attempt any THREE of the following:** **12**

a) List-out advantages and limitations of functional layout.

b) List-out advantages and limitations of Lean manufacturing.

c) Enumerate the principles of motion economy pertaining to design of tools and equipments.

d) Compare between CPM and PERT.

e) Monthly sales for the past six months of a mechanical spare parts company is given below :–

| Month | Jan | Feb | March | April | May | June |
|---|---|---|---|---|---|---|
| Sales (Units) | 250 | 262 | 277 | 294 | 308 | 325 |

Using exponential smoothing method, forecast sales for July. Assume smoothing constant = 0.35.

**Marks**

**5. Attempt any TWO of the following:** **12**

a) List-out the factors considered for locating a new steel plant.

b) A small shaft is to be manufactured from a round bar an four machines in workshop. The sequence of operation is :–

i) Raw material cut to length on power Hack-saw machine.

ii) "Faced to length" and "Centered" on special purpose facing and centering machine.

iii) Turning operation on copying lathe.

iv) Cutting of the keyways on a special purpose key way milling machine.

v) File deburring and visual inspection. Draw up a process sheet for the manufacture of this part assuming suitable data.

c) An industrial operation consists of five elements with following observed time and the performance rating.

| Element | Observed time (Minutes) | Performance rating (%) |
|---|---|---|
| A | 0.20 | 85 |
| B | 0.08 | 80 |
| C | 0.50 | 90 |
| D | 0.12 | 85 |
| E | 0.10 | 80 |

Assuming rest and personal allowance as 15% and contingency allowance as 2% of the basic time, Calculate standard time per piece.

**Marks**

**6. Attempt any TWO of the following:** **12**

a) Prepare a two hundred process chart for changing tyre of automotive car.

b) Six jobs processed on Machine-I and then on Machine-II. The order of job has no significance. The table below shows the machine time in hours for six jobs on two machines.

| Job ⟶ | $J_1$ | $J_2$ | $J_3$ | $J_4$ | $J_5$ | $J_6$ |
|---|---|---|---|---|---|---|
| Machine-I | 2 | 4 | 9 | 6 | 7 | 4 |
| Machine-II | 6 | 7 | 4 | 3 | 3 | 11 |

Find the sequence of the job that minimizes the total elapsed time to complete the jobs. Also find the idle time for machine I and machine II.

c) A manufacturing firm producing product $P_1$ and $P_2$ both of which have to be processed on machine $M_1$ and machine $M_2$. Product $P_1$ requires two hours on both machines $M_1$ and $M_2$, while product $P_2$ required 3 hours on machine $M_1$ and only 1 hour on machine $M_2$. There are only 12 and 8 hours available on machine $M_1$ and $M_2$ respectively. The profit per unit is estimated at Rs. 600 and Rs. 700 for product $P_1$ and $P_2$ respectively. Formulate the LP problem and find out number of units of product $P_1$ and $P_2$ to be produced to maximize the firm's profit graphically.

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