

**B.E. PRINTING ENGINEERING FOURTH YEAR FIRST SEMESTER EXAM 2025****Subject: INDUSTRIAL MANAGEMENT****Total marks: 100****Time: 3 Hr.****CO1**

1. a) Classify the different stages of production management model (6)
- b) Describe the advantage & disadvantage of the following (**any one**): (6)  
Job production, Batch production, Mass production or Process production
- c) Classify the different objective & importance of Production Planning & Control (PPC) model. (6)

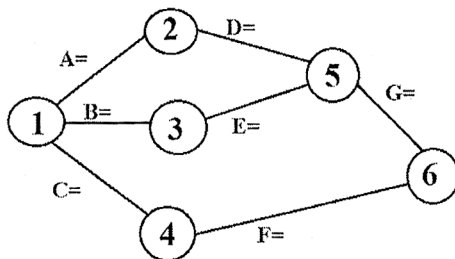
**CO2**

2. a) In a graphic designing & packaging company, sales team had a monthly advertisement expenditure (X) for sales which gave them reasonable sales outcome (Y) which are shown in below table. Draw the relationship between X & Y. Also estimate the correlation coefficient (r). Also find the RMSE value for predicted outcome [Note: mention the required formulas for intercept (a), slope (b) and 'r'].

**(10)**

| Month | Advertisement expenditure (\$ in million) (X) | Sales outcome (\$ in million) (Y) |
|-------|-----------------------------------------------|-----------------------------------|
| M1    | 3                                             | 8                                 |
| M2    | 2                                             | 10                                |
| M3    | 4                                             | 12                                |
| M4    | 5                                             | 10                                |
| M5    | 7                                             | 15                                |

- b) Estimate & draw the network diagram for finding critical event, critical path, expected project length. Given that the scheduled project duration is 19 weeks. Calculate the SD & variance of project length. If the project duration is 19 weeks then what is the probability of meeting & not meeting the due date? If the scheduled completion time is 20 weeks then what is the probability of project completion? If the probability of completion is 90% then what will be completion time?

**(18)**

| Activity | $t_o$ | $t_m$ | $t_p$ | Expected time (u) = $t_e =$ | Variance ( $\sigma^2$ ) = | Given |        |
|----------|-------|-------|-------|-----------------------------|---------------------------|-------|--------|
| 1-2 (A)  | 1     | 1     | 7     |                             |                           | z     | P(z)   |
| 1-3 (B)  | 1     | 4     | 7     |                             |                           | 1.29  | 0.9015 |
| 1-4 (C)  | 2     | 2     | 8     |                             |                           | 0.67  | 0.7486 |
| 2-5 (D)  | 1     | 1     | 1     |                             |                           | 0.68  | 0.7518 |
| 3-5 (E)  | 2     | 5     | 14    |                             |                           | 0.69  | 0.7549 |
| 4-6 (F)  | 2     | 5     | 8     |                             |                           | 1.00  | 0.8413 |
| 5-6 (G)  | 3     | 6     | 15    |                             |                           | 1.28  | 0.8997 |

**CO3 (any three)**

3. a) Apply the economic production quantity (EPQ) model with schematic diagram to show that:  $Q^* = \sqrt{\frac{2DS}{IC} \left( \frac{P}{P-D} \right)}$ . (6)
- b) Apply Break Even analysis model to (i) deduce the break-even quantity or point (BEP) and (ii) estimate the number of units needed to be produced to get a profit of 20,000/- in a printing & packaging company as they are using old conventional machineries for their existing production which are making them non-profitable. To improve the existing scenario, a modern machinery system are installed worth of 100,000/-. Existing selling price is 200/- per unit & variable cost is 100/- per unit. (6)

- c) In a printing & packaging company, the existing selling price is 100/- & variable cost per unit is 60/-. The existing fixed cost is 10,00,000/-. Now, due to inflation the variable cost has increased by 10% while

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fixed costs have increased by 5%. If the breakeven quantity is to remain constant, by what percentage should the sales price be raised?

(6)

d) Apply the economic order quantity (EOQ) model to prove following relationship with schematic diagram.  $Q^* = \sqrt{\frac{2DS}{IC}}$ .

(6)

**CO4**

4. a) Analyze the advantage & limitations of Combination layout or Group layout. (6)
- b) Analyze different characteristics of good packaging. (6)
- c) Explain the stages of Decision Making with schematic diagram. Characteristics of Decision Making. (6)

**CO5**

5. a) Illustrate briefly the Eight pillars of Total Productive maintenance (TPM). (8)
- b) Illustrate the legislative steps that government should undertake in printing & packaging sector to improve the quality standards of product? Illustrate the benefits of marketing and differentiate between selling vs marketing. (4+3+3)

Or

Illustrate the 4<sup>th</sup> & 2<sup>nd</sup> weighted moving average forecast & exponential smoothing average forecast and its corresponding RMSE value to determine the most suitable production forecast. Weightage for 4WMA and 2WMA are given below along with Smoothing coefficient ( $\alpha$ ). (10)

| Weighted moving average forecast |                  |          |        |          |        | Exponential Smoothing |        | Weightage (for WMA) |     |
|----------------------------------|------------------|----------|--------|----------|--------|-----------------------|--------|---------------------|-----|
| Month                            | Demand in 1K pcs | 4WMA     | Error2 | 2WMA     | Error2 | Forecast              | Error2 | For 4WMA            |     |
| M1                               | 20               |          |        |          |        |                       |        | W1                  | 0.4 |
| M2                               | 10               |          |        |          |        |                       |        | W2                  | 0.3 |
| M3                               | 40               |          |        |          |        |                       |        | W3                  | 0.2 |
| M4                               | 10               |          |        |          |        |                       |        | W4                  | 0.1 |
| M5                               | 20               |          |        |          |        |                       |        | For 2WMA            |     |
| M6                               | 30               |          |        |          |        |                       |        | W1                  | 0.6 |
| M7                               | 20               |          |        |          |        |                       |        | W2                  | 0.4 |
| Forecast for M8                  |                  |          |        |          |        |                       |        |                     |     |
|                                  |                  | Forecast | RMSE   | Forecast | RMSE   | Forecast              | RMSE   | ( $\alpha$ )        | 0.2 |