Q5a) $r_p = 500 \times 250$ units/yr $\quad r_d = 100000$ units/yr

$C_o = 25 \quad C_h = 12.5\% \times 2 = 0.25$

- $Q^* = \sqrt{2 r_d \cdot \frac{C_o}{C_h} \left(\frac{r_p}{r_p - r_d} \right)}$

$= 10,000$ units

- total cost on basis of optimal policy

$= \sqrt{2 r_d C_o C_h \cdot \left(1 - \frac{r_d}{r_p}\right)} + 2 \times 100000$

$=$ Rs $200500/-$

- Optimal no. of set-ups

$= \frac{r_d}{Q^*} = 10$ set-ups.

Q5 b)

- Reorder level = Max. Consumption × Max. Reorder point

Component P : 900 × 6 = 5400 units

Component Q : 900 × 4 = 3600 units

- Minimum stock level = Reorder level − [normal consumption × normal reorder period]

P = 5400 − (600 × 5) = 2400 units

Q = 3600 − (600 × 3) = 1800 units

- Max. stock level =
  Reorder level + Reorder quantity − (min. consumption × min. reorder point)

P = 5400 + 4000 − (300 × 4) = 8200 units

Q = 5400 + 7000 − (300 × 2) = 11,200 units

- Average stock level = Min. stock level + $\frac{1}{2}$ Reorder quantity.

P = 2400 + $\frac{1}{2}$ (4000) = 4400 unit

OR

P = (Min. level + max. level)/2 = (2400 + 8200)/2 = 5300 units

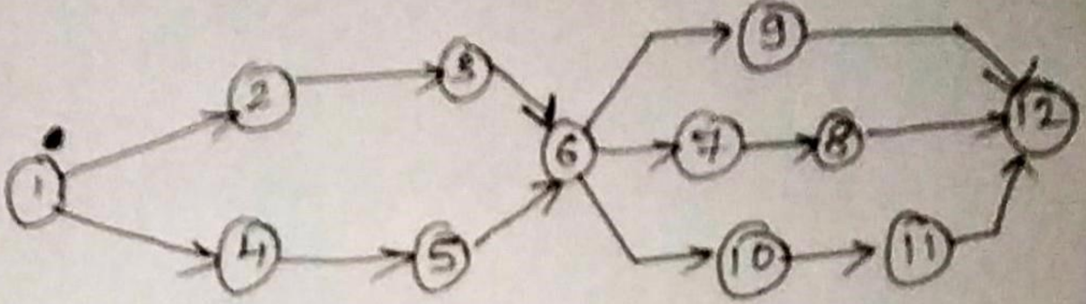
Q = Min. level + $\frac{1}{2}$ Reorder qty. = 1800 + $\frac{1}{2}$ (7000) = 5300 units

OR

Q = (Min. level + max. level)/2 = (1800 + 11,200)/2 = 6500 units

Q2 b)

Network Diagram



- Cycle time = 12 seconds
- Min. no. of workstations = sum of total task / cycle time

  $= 50/12 = 4.16 \simeq 05$

- Line efficiency $= \frac{\text{sum of total task}}{\text{no. of w/s} \times CT} = \frac{50}{5 \times 12}$

  $= 0.833 = 83.3\%$

- Balance Delay $= 1 - 0.833 = 0.167 = 16.7\%$
- Smoothness Index = 34