

Model Answer Paper

B. Tech VII semester

TT/TE

Production Planning and
Quality Management

~~TT/TE~~ - 2

Note - Attempt all the questions

- Q.1 Plan a spinning mill machines to produce 4 tons of 40's PV blended yarn per day. assume machine specifications and intermittent product particulars, efficiencies as prevailing in most of the spinning mills in today era.
- Q.2 Elaborate the term "Production Information System: Feeding and retrieval of data"

Ans. R1.
 Given - Production = 4000 kg/day
 Count = 40^s

(1) No. of Ring Frames Required -

R/F Machine particulars = Dia of front Roll = 1"
 RPM of front Roll = 270
 efficiency = 97%.

No. of spindles/frame = 480

$$\text{Prod'n in Kgs/Day/frame} = \frac{\pi d n \times 60 \times 8 \times 3 \times \eta \times \text{no. of spindles/frame} \times \text{Count} = 40^s}{36 \times 840 \times 2.2 \times 40}$$

$$= \frac{3.14 \times 1 \times 270 \times 60 \times 8 \times 3 \times 97 \times 480}{36 \times 840 \times 2.2 \times 40 \times 100}$$

$$= 213.60 \text{ kg/day/frame}$$

Add 1% Banda waste - then total prod'n = 4040

$$\text{No. of R/F's required} = \frac{4040}{213.60}$$

$$= 18.72$$

$$\approx 19 \text{ R/F}$$

(2) No. of Speed Frame Required -

S/P Machine Particulars = Dia of front Roll = 1"
 RPM " " " = 270
 efficiency = 85%.

no. of spindles/frame = 120
 Hank of Roving = 1.5

$$\text{Prod'n in Kgs/Day/frame} = \frac{\pi d n \times 60 \times 8 \times 3 \times \eta \times \text{no. of spindles/frame}}{36 \times 840 \times 2.2 \times 1.5}$$

$$= \frac{3.14 \times 1 \times 270 \times 60 \times 8 \times 3 \times 85 \times 120}{36 \times 840 \times 2.2 \times 1.5 \times 100}$$

$$= 1247.84$$

Add 0.5% waste then total prod'n required = 4040 + 0.5%
 ≈ 4060.2

$$\text{No. of S/P's required} = \frac{4060.2}{1247.84} = 3.25$$

$$\approx 4 \text{ S/F.}$$

(13) No. of draw frames Required =

D/R Machine Particulars - Dia of Ranks Roll = 1.5"
 RPM " " " = 1600
 efficiency = 95%.

No. of Delivery/frame = 2

Hank of sliver = 0.15

No. of D/R Required

$$\text{Prodn in kgs/Day/frame} = \frac{\pi d n \times 60 \times 8 \times 3 \times \eta \times \text{No. of del.}}{36 \times 840 \times 2.2 \times 0.15}$$

$$= \frac{3.14 \times 1.5 \times 1600 \times 60 \times 8 \times 3 \times 95 \times 2}{36 \times 840 \times 2.2 \times 0.15 \times 100}$$

$$= 2066.14$$

Add 0.5% Waste = 4080.50 kg required prodm

No. of D/R's required = 1.97

$$\approx 2$$

We give 2 passages of D/F them

Total No. of D/R's required = 4

(14) No. of Carding Machines Required =

Carding machine Particulars = Doffer Dia = 27"
 Doffer RPM = 45
 efficiency = 85%
 Hank of sliver = 0.15

$$\text{Prodm in kgs/day/m/c} = \frac{\pi d n \times 60 \times 8 \times 3 \times \eta}{36 \times 840 \times 2.2 \times 0.15}$$

$$= \frac{3.14 \times 27 \times 45 \times 60 \times 8 \times 3 \times 85}{36 \times 840 \times 2.2 \times 0.15 \times 100}$$

$$= 467.94$$

Add 3% Waste = ~~4080.5~~ 4202.91

No. of Carding m/c's required = $\frac{4202.91}{467.94} = 8.98$
 ≈ 9 machines

(15) No. of Blow Room required =

Blow Room Particulars = Shell Roll Dia = 9"
 Shell Roll RPM = 10
 efficiency = 85%
 Hank of lap = 0.0015

$$\text{Prodm in kgs/day/m/c} = \frac{\pi d n \times 60 \times 8 \times 3 \times \eta}{36 \times 840 \times 2.2 \times 0.0015}$$

$$= \frac{3.14 \times 9 \times 10 \times 60 \times 8 \times 3 \times 85}{36 \times 840 \times 2.2 \times 0.0015 \times 100} = 3466.23$$

Add 1% Waste = ~~4080.5~~ 4244.93

No. of Blow Room Required = $\frac{4244.93}{3466.23} = 1.22$
 ≈ 2 m/c's

Answer - No. of m/c's required

= Blow Room = 2

Carding = 9

Draw Frame = 4

Speed frame = 4

Ring Frame = 19

Ans Q.2. Production is a sequence of technical processes: requiring either directly or indirectly the mental and physical skill of craftsman and consists of changing the shape, size and prosperity of materials and ultimately converting them into more useful articles.

We can also define the production as "an organised activity of transforming raw materials into finished products".

Production can also be defined as "Producing goods which satisfies some human wants."

We plan our production activities in the following steps

(1) Planning (2) Organising (3) Staffing (4) Directing (5) Controlling

With the help of aforesaid steps we develop systems in our production department, and follow the systems, and record all the related activities - The Data, which can be retrieve ~~later~~ as and when required. This is ⁱⁿ summarised form but holds each and every information. This is known as Production Information System.

Benefits of Production Information System Feeding and retrieval of data -

- (i) For ISO standardisation and Total Quality Management ^{of} all the production data and information of the entire unit including intermittent processes is essential.
- (ii) Raw Material - their quality control, costing
- (iii) Machines - their specifications, setting, gauges, speeds, efficiency, productivity
- (iv) Human Resources: Employees strength, their output, costing
- (v) Costing: Power consumption, optimum use and efficiency standards of every machine, man, material, money
- (vi) ~~Area~~ stores consumption: life, ~~and~~ wear and tear, maintenance schedules of every thing
- (vii) Waste Management: Standardization of waste
- (viii) Environment Management and working conditions
- (ix) Analysis of the data for improvement, cost control, quality ^{improvement}
- (x) complaint or Dispute: Helps in solving complaints, Disputes
- (xi) Packaging, system of Delivery, Purchasing and Marketing activities
- (xii) Framing of Quality Policy, Quality system, Quality Manual, Quality Audit, Quality Design, Adopting new technology