Industrial Management

Mid-Sem Exam

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Q1)

(i) Management is a variable/factor of production and an economic resource. It is responsible for ensuring that labor and capital are effectively used to increase Productivity. This increases includes improvements made through the use of Knowledge and the application of technology in present time.

(ii) External factors that affect an organisation may be political, economic, social or technological. The same internal factors that lead to an organizations success inevitably characterize that organizations also can learn from the

the organizations external enviorment and communicate succesfully with it.

(iii) Management by objectives (MBO):-
It is a framework brought to light by management consultents based on a need to manage bussiness based on its needs and goals.

Cheif Characteristics:
→ goal orientation
→ Participation
→ Systems Approach
→ optimization of resources
→ Key result Areas
→ Finance
→ Simplicity and Dynasim.

(iv) Roles of managers Can be Catogrized as follows:
1) Interpersonal:
a) being a figurehead
b) " " leader
c) " " Liason

2.) Informational:
      a) Monitor.
      b) Disseminator.
      c) Spokesperson.

3) Desi Decicional:
      a) Entreprenurial descisons
      b) Allocation of resources
      c) Dealing with discomforts
      d) Negotiatron.

V) Mission :-
is developed By combining the
ambition from a given statement for
the reasons of enistance of the organiyd
including the bussiness scope and operations
and adding specificity to it.
   • Goals: further addition of details
in an ⚹ Mission with proper refinement
results to the goals. These are more
specific and focuses on the org.

- Objectives: are more specific than goals, it seeks the results. These are the statement of the required results. A very specific objective is derived from a goal

(Vi)

Product	Services
○ Tangible	○ Intangible
○ Storage can be inventoried	○ Storage cannot be inventoried.
○ Low Low Contact Customers	○ High Contact Customers.
○ Capital intensive	○ Labor Intensive
○ Quality is Measurable	○ Quality is more Subjective and is non-measurable.

(Vii) • A vertical organization is one that relies on managers to command and control thier employees doktotol work.. A bussiness owner is typically at the top of a vertical chain compound.

• A horizontal organization is one having a flat structure that provides greater employee autonomy. It has few or no levels of middle management between staff and executives.
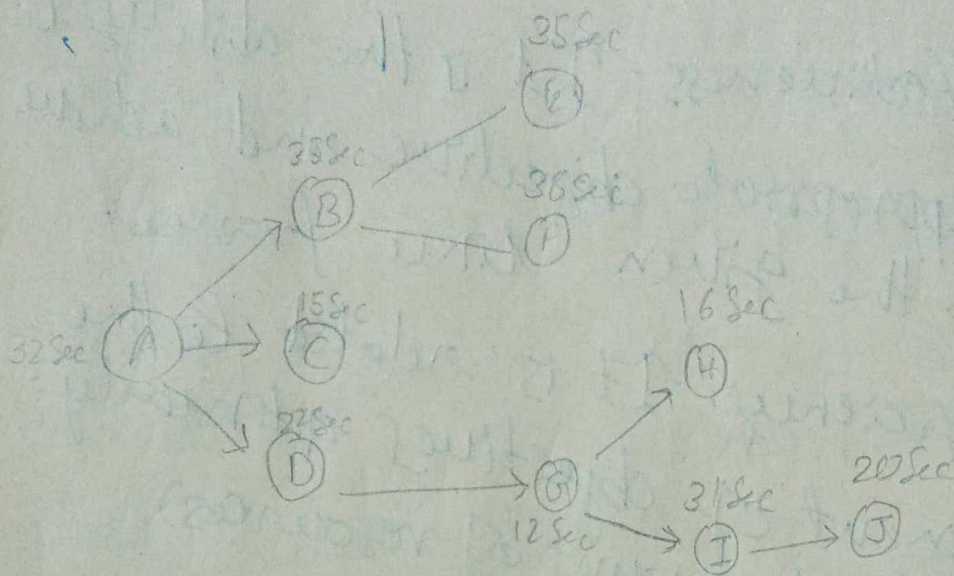
(viii)

• Effectiveness: It is the ability to set appropriate objective and achieve it in the given time frame.

• Efficiency: It is related to the achievement of objectives optimally (using least amount of resources)

a) Required output = 500 units/day

Working hours = 7.5 hours
workday

→ Arrow Diagram:

$$\text{Max}^{m} \text{ Production} = \frac{7.5 \times 60 \times 60}{38}$$

$$= 710 \text{ units}$$

$$\text{Required Cycle Time} = C = \frac{7.5 \times 60 \times 60}{500}$$

$$= 54 \text{ Sec/unit}$$

Theoritical minimum no of work stations:

$$N_t = \frac{\text{Sum of task time}}{\text{Cycle time}}$$

$$N_E = 266/54 = 4.74 \approx 5$$

b)

Task	Followers	Time (sec)
A	8	32
D	4	22
G	3	12
B	2	35
I	1	31
F	0	38
E	0	35
J	0	20
H	0	16
C	0	15

$\Rightarrow$ Arrow Diagram!

Station 1	Station 2	Station 3
A (54-32=22) C(22-15=7) Idle = 7	D(54-22=32) G(32-12=20) H(20-16=4) Idle = 4	B(54-35= 19) Idle = 19
Station 4	Station 5	Station 6
I(54-31=23) J(23-20=3) Idle = 3	F(54-38=16) Idle = 16	E(54-35=19) Idle = 19

C) The line is not perfectly balanced as all the workers would not complete then assigned work at the same time (due to different idel times for all work stations)

$$\text{Utilization} = \frac{\text{Min no of work stations}}{\text{Actual no of work stations}}$$

$$= 5/6 = 83.33\%$$

no of work station = 6

d)

St.1	St.2	Station 3	Station 4	Station 5
A(54-32) = 22	B(54-35) = 19	F(54-38) = 16	E(54-35) = 19	I(54-31) = 23
D=(22-22) = 0	C=(19-15) = 4	G(16-12) = 4	H(19-16) = 3	J(23-29) = 3

So, Idle time are in order
①< ④ = ⑤ < ② = ③

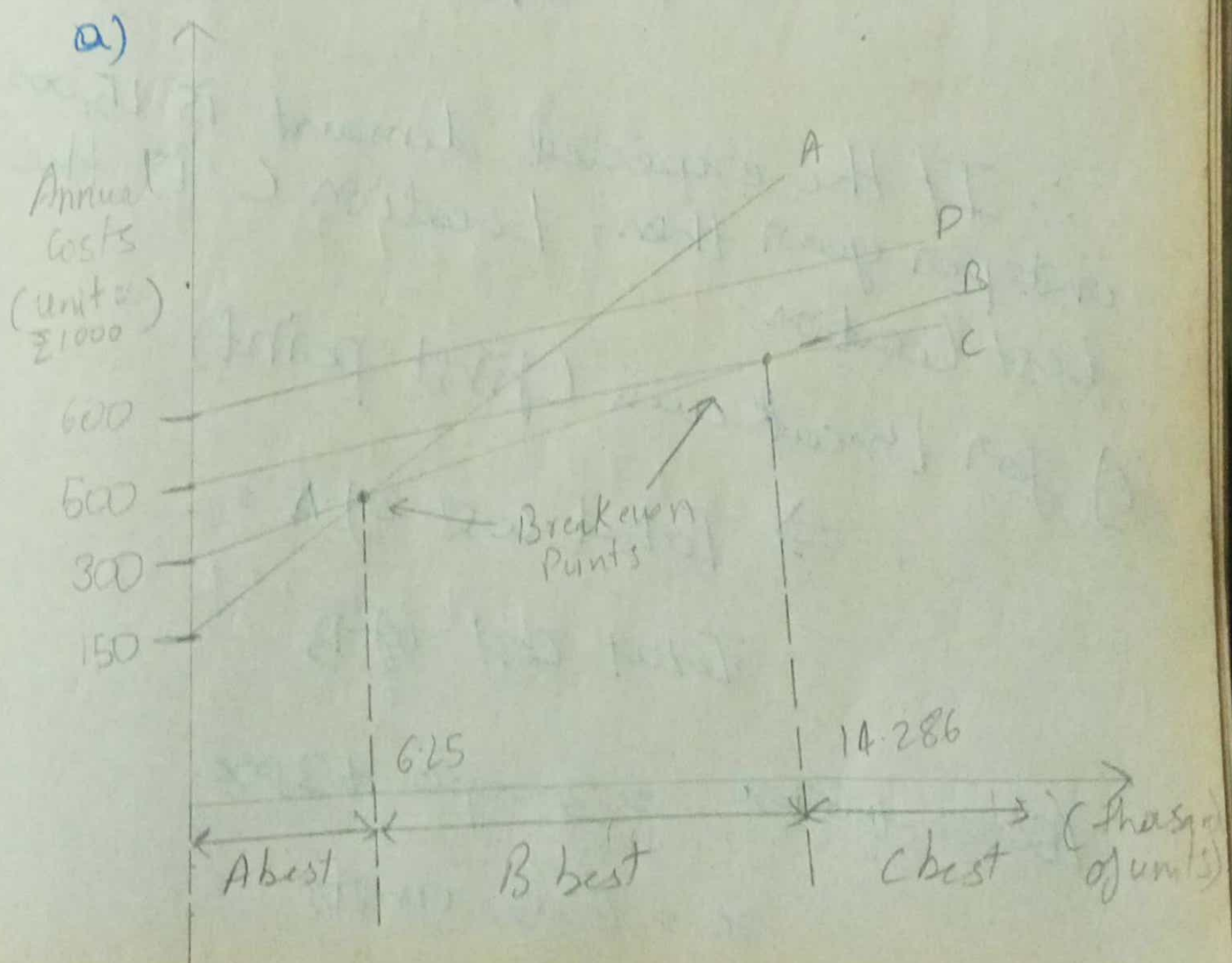This though imperfect arrangement has the lowest idle time compared to other arrangements.

(Q3)

x = no. of units produced.

$\Rightarrow$ Total cost of A $= 15000 + 62x$

" " " B $= 200060 + 38x$

" " " C $= 500000 + 24x$

" " " D $= 600060 + 30x$

a)

Annual Costs (unit $\pounds$) $\pounds 1000$

600
500
300
150

625   14.286

A best   B best   C best   (thous. of units)

Breakeven Points

b) If once $x = 15000$ units

Total cost of A = $150000 + 62(15000)$

$= ₹ 945000$

" " " B = $300000 + 38(15000)$

$= ₹ 600,000$

" " " C = $500000 + 24(15000)$

$= ₹ 440,000$

" " " D = $600000 + 30(15000)$

$= ₹ 51,0,000$

∴ If the expected demand is 15,000 units per year then, Location C is the best location.

c) For Breakeven (first point)

⟹ Total cost of A =

Total cost of B

$150000 + 62x = 300000 + 38x$

$x = 6250$ units

$x = 6250$ units $\Rightarrow$ 1st Breakeven
point

for the 2nd point

$$\text{Total cost of B} = \text{Total cost of C}$$

$$300000 + 38x = 500000 + 24x$$

$$x = 14286 \text{ units}$$

Q4) Deleting 2nd observation of element no 3 (because, This may be due to bussiness interuptions, conferences with the boss or my mistakes of an unusual nature as this is non recurring observations)

→ Average time of each job element:

for element 1 = $\dfrac{1.51 + 1.63 + 1.48 + 1.55 + 1.72}{5}$

$$= 1.578 \text{ min}$$

for element 2 = $\dfrac{2.46 + 2.34 + 2.33 + 2.36 + 2.30}{5}$

$$= 2.358 \text{ min}$$

for element 3 = $\dfrac{1.79 + 1.84 + 1.78 + 1.77}{4}$

$$= 1.795 \text{ min}$$

" " 4 = $\dfrac{1.25 + 1.41 + 1.40 + 1.15 + 1.29}{5}$

$$= 1.24 \text{ min}$$

Normal time for each job element:

for element 1 = [Average time] × (PR)

$$= 1.578 \times 1$$

$$= 1.578 \text{ min}$$

element 2 = $2.358 \times 0.9 = 2.122$ min

element 3 = $1.795 \times 0.95 = 1.705$ min

element 4 = $1.24 \times 1.15 = 1.426$ min

Estimated Total Time = 6.831 min

b) Here $z = 1.96$ (95% Confidence)

$A = 0.05$ (Acceptable error level)

no of total observations = $5 \times 4 = 20$

no of observations having (PR ≥ 100)

(idle observations) = 10

Estimated value of sample proportion, $P = \dfrac{10}{20}$

$$= 0.5$$

Hence

required Sample Size

$$n = \frac{3^2 \cdot P(1-P)}{A^2}$$

$$= \frac{(1.96)^2 (0.5)^2}{(0.05)^2}$$

$$= 384.16$$

$$\simeq 385 \text{ observations}$$

a) Work Enlargement:

Increasing the scope of a job through extending the range of its job duties and responsibility generally within the same level and perphertly.

Work Enlargement involves combining various activites at the same level in the organisation and adding them to the existing work.

b) Work Enrichment:

⇒ It is method of motivating employes where a job is designed to have interesting intresting and challenging tasks which can require more skill and can increase pay

Binary weight	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	A	2^3	b^2	2^1	2^0	Decimal equiv.	Rank
Ports M/C	1	2	3	4	5	6	7	8	9	10	11	12		
1	1		1		1			1					1362	4
2	1			1		1		1			1		1362	5
3				1		1							220	6
4	1		1				1	1					2600	1
5	1		1				1	1					2600	2
6	1		1				1	1					2600	3
7					1					1		1	133	7
8					1					1		1	133	8

Rearranging the rows according to their ranks such that M/C(s) becomes of order 4 – 5 – 6 – 1 – 2 – 3 – 7 – 8

Parts M/C	1	2	3	4	5	6	7	8	9	10	11	12	Binary Weight
4	1		1				1		1				$2^7 = 128$
5	1		1				1		1				$2^6 = 64$
6	1		1				1		1				$2^5 = 32$
1		1		1		1		1			1		$2^4 = 16$
2		1		1		1		1			1		$2^3 = 8$
3				1		1		1					$2^2 = 4$
7					1					1		1	$2^1 = 2$
8					1					1		1	$2^0 = 1$
DE	224	24	224	28	3	28	224	28	224	3	24	3	
Ranks	1	7	2	5	10	6	3	8	4	11	9	12	

Rearrange the Columns according to thier Ranks such that parts order become

1-3-7-9-4-6-2-8-11-5-10-12

Parts / M/c	1	3	7	9	4	6	2	8	11	5	10	12
4	1	1	1	1								
5	1	1	1	1								
6	1	1	1	1								
1	1		1	1								
2					1	1	1	1	1			
3					1	1	1	1	1			
7					1	1				1		
8										1	1	1
										1	1	1

These are the required cells.