Question 1 ———?

(i) Management is a factor of production and an economic resource. Management is responsible for ensuring that labor and capital are effectively used to increase productivity.
Management accounts for over half of the annual increase in productivity. This increase 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 organization's success inevitably characterize that organization's relationship to the external environment in these broad area.
Leaders who can learn and communicate what they've learned within their organizations also can learn from the org's external environment and communicate successfully with it.

(iii) Management by Objectives (MBO), is a management concept framework popularized by management consultants based on a need to manage business based on its needs and goals.
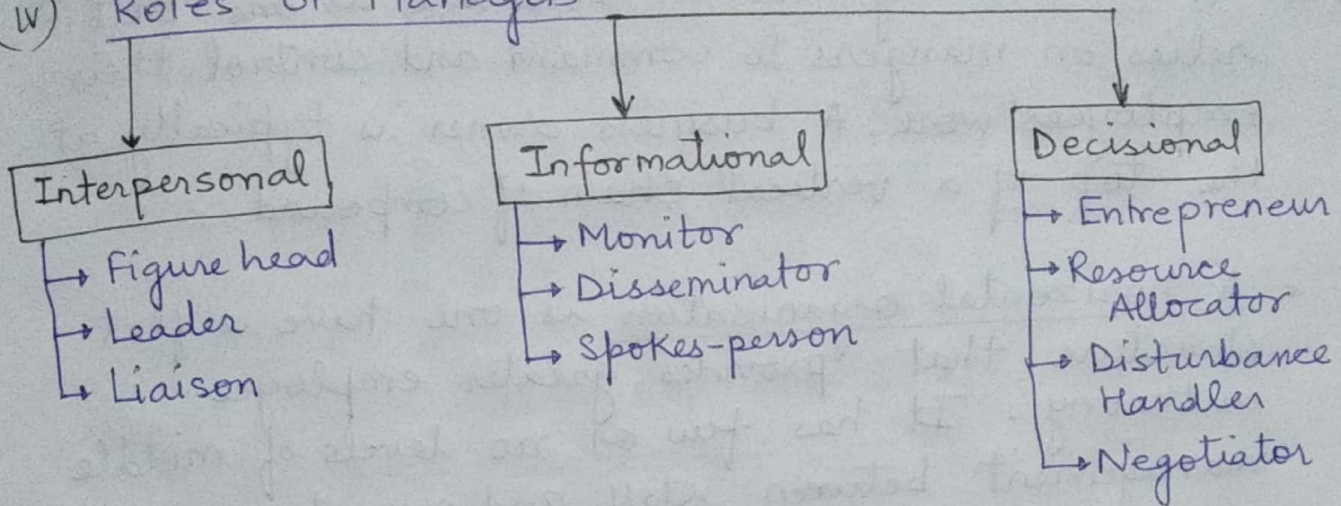
- **characteristics:**
  - → Goal orientation
  - → Participation
  - → Key Result areas
  - → Finance
  - → Systems Approach
  - → optimization of resources
  - → Simplicity & Dynamism.

(iv) Roles OF Managers

Interpersonal	Informational	Decisional
→ Figure head	→ Monitor	→ Entrepreneur
→ Leader	→ Disseminator	→ Resource Allocator
→ Liaison	→ Spokes-person	→ Disturbance Handler
		→ Negotiator

(v). **Mission** is developed from vision by adding specificity and gives statement for the reasons of the existance of the organisation, including the business scope and operations.

• **Goals**: Further addition of details in Mission with proper refinement results to the goals. These are more specific and focuses in organization.

• **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 can not be inventoried.
→ Low contact constomers	→ High contact customers.
→ Capital Intensive	→ Labour intensive
→ Quality is Measurable	→ Quality is non-measureable

(vii) . A <u>Vertical organization</u> structure is one that relies on mangers to command and control their employees' work. A business owner is typically at the top of a vertical chain of compound.

- A <u>horizontal organisation</u> is one have a flat structure that provides greater employee autonomy. It has few or no levels of middle management between staff and executives .

(viii) • <u>Effectiveness</u> : It is the ability to set appropriate objective and achieve it in the given time frame .

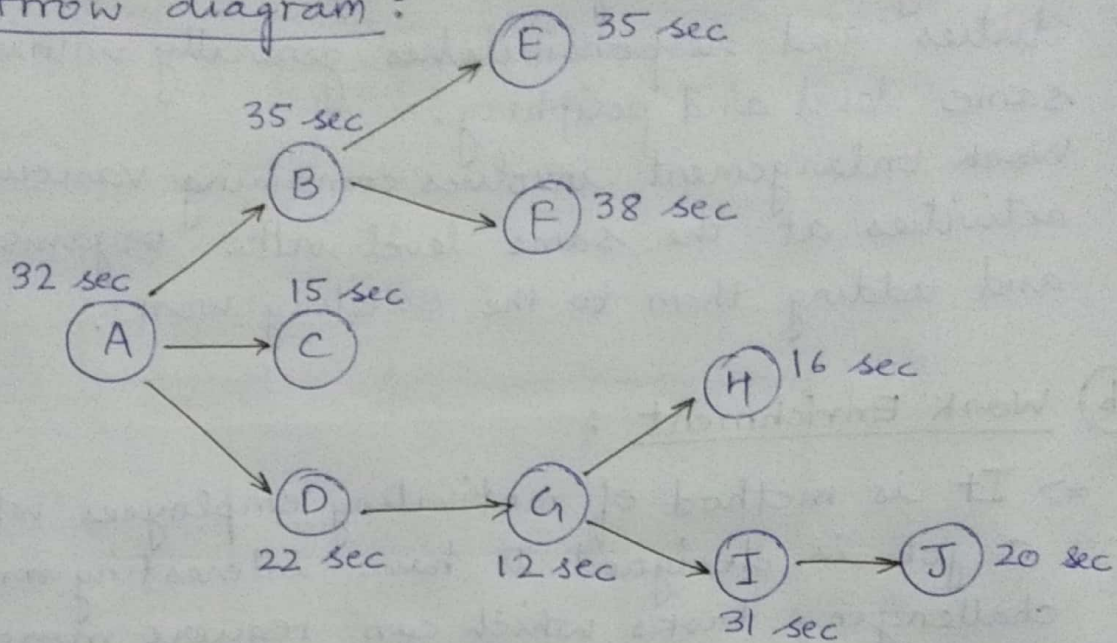• <u>Efficiency</u> : It is related to the acheivement of objectives optimally . i.e, using least Resources.

Q.2) —————— ?

Sol^n: (a) Required output = 500 units/day

Working hours = 7.5 hours work day

Arrow diagram :

Maximum Production = $\dfrac{75 \times 60 \times 60}{38}$

= 710 units

Required cycle Time, $C = \dfrac{7.5 \times 60 \times 60}{500}$

= 54 sec/unit

Theoritical minimum no. of work stations, N_t

$$N_t = \dfrac{\text{Sum of task time}}{\text{cycle time}}$$

$$= \dfrac{256}{54} = 4.74 \text{ or } 5$$

(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

Now, from Arrow Diagram :

station 1

A $(54-32=22)$

C $(22-15=7)$

Idle $= 7$

station 2

D $(54-22=32)$

G $(32-12=20)$

H $(20-16=4)$

Idle $= 4$

station 3

B $(54-35=19)$

Idle $= 19$

station 4

~~E $(54-38-16)$~~

I $(54-31=23)$

J $(23-20=3)$

Idle $= 3$

station 5

F $(54-38)=16$

Idle $= 16$

station 6

E $(54-35=19)$

Idle $= 19$

(c) The line is not perfectly balanced, as all the workers would not complete their assigned work (Task) at the same time (since, idle times are different for all work stations).

$$Utilization = \frac{Minimum\ no.\ of\ work\ stations}{Actual\ no.\ of\ work\ stations} \times 100$$

$$= \frac{5}{6} \times 100$$

$$= 83.33\%.$$

No. of work stations used = 6.

(d)

St. 1	St. 2	St. 3	St. 4	St. 5
A (54-32)	B (54-35)	F (54-38)	E (54-35)	I (54-31)
= 22	= 19	= 16	= 19	= 23
P (22-22)	C (19-15)	G (16-12)	H (19-16)	J (23-20)
= 0	= 4	= 4	= 3	= 3
—	=	<	—	=

So, Idle time are in order

$$① < ④ = ⑤ < ② = ③$$

This is also not a perfectly balanced line as Idle time of ②, ③, ④, ⑤ ≠ 0

But, These can be used as it has lowest idle time compared to other permutations.

Q.3) ——————— ?

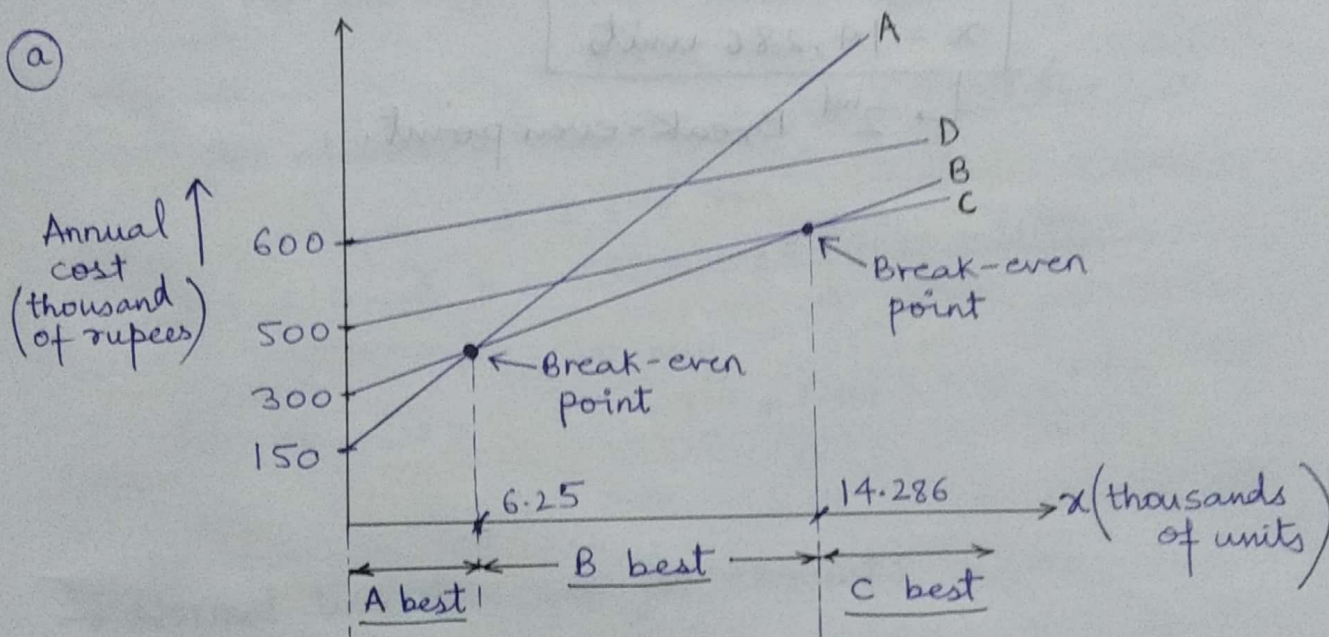Sol^n : Let x be no. of units produced

then,

Total cost of A = 150000 + 62x

" " " B = 300000 + 38x

" " " C = 500000 + 24x

" " " D = 600000 + 30x

(a)

(b) Here, $x = 15000$ units

then, Total cost of A = 150000 + 62(15000) = Rs 945,000

" " " B = 300000 + 38(15000) = Rs 600,000

" " " C = 500000 + 24(15000) = Rs 410,000

" " " D = 600000 + 30(15000) = Rs 510,000

Hence, If the expected demand is 15,000 units per year then, __Location C__ is the best location.

(c) For Break-even (first) point.

$\Rightarrow$ Total cost of A = Total cost of B

$\Rightarrow 150000 + 62x = 300000 + 38x$

$\Rightarrow \boxed{x = 6250 \text{ units}}$

$\llcorner$ 1st Break-even point.
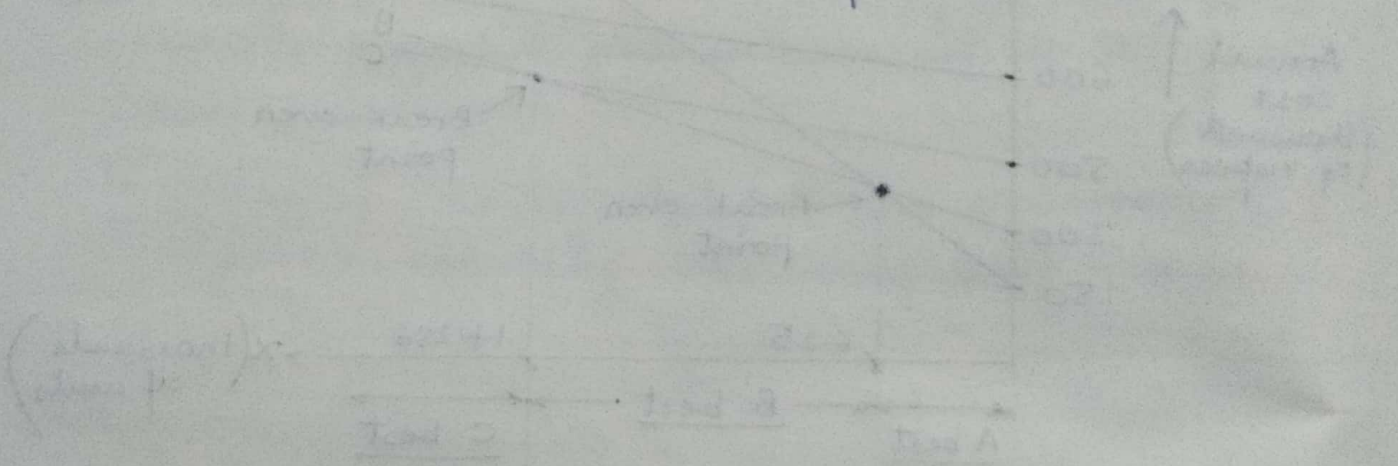
• for 2nd Break-even point :

$\Rightarrow$ Total cost of B = Total cost of C

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

$\boxed{x = 14,286 \text{ units}}$

$\llcorner$ 2nd Break-even point.

Q.4) ————————?

Sol^n: First of all deleting the 2nd observation of element 3, (because This may be due to business interuptions, conferences with the boss or mistakes of an unsual nature as this is non recurring observations).

→ Average time of each job element:

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

$\qquad = 1.578$ min.

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

$\qquad = 2.358$ min.

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

$\qquad = 1.795$ min.

for element 4 = $\dfrac{1.25 + 1.11 + 1.40 + 1.15 + 1.29}{5}$

$\qquad = 1.24$ min.

→ Normal time for each job element:

for element 1 = (Avg. time) × (PR)

$\qquad = 1.578 × 1 = 1.578$ min

for element 2 = 2.358 × 0.9 = 2.122 min.

for element 3 = 1.795 × 0.95 = 1.705 min.

for element 4 = 1.24 × 1.15 = 1.426 min.

Hence,
Total estimated Normal time = 6.831 min.

Ans

(b) Here, $Z = 1.96$ (for 95% confidence)

$A = 0.05$ (Acceptable error level)

No. of total observations $= 5 \times 4 = 20$

No. of observations having

PR $\geqslant 100$ $= 10$

(idle observations)

So,

estimated value of sample

proportion, $p = \dfrac{10}{20} = 0.5$

Hence,

required sample size, $n = \dfrac{Z^2 p (1-p)}{A^2}$

$\Rightarrow n = \dfrac{(1.96)^2 \; 0.5 \times 0.5}{(0.05)^2}$

$n = 384.16$ or 385 observations Ans

Q.5) (A) ———————— ?

(a) Work Enlargement :

=> It means increasing the scope of a job through extending the range of its job duties and responsibilities generally within the same level and periphery.
Work Enlargement involves combining various activities at the same level in the organisation and adding them to the existing work.

(b) Work Enrichment :

=> It is method of motivating employees where a job is designed to have interesting and challenging tasks which can require more skill & can increase pay.

Q.5) ——————— **?**

Soln :

Binary weights	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	Decimal Equivalents	Ranks
	2048	1024	512	256	128	64	32	16	8	4	2	1		
M/c \ Parts	1	2	3	4	5	6	7	8	9	10	11	12		
1		1		1		1		1			1		1362	4
2		1		1		1		1			1		1362	5
3				1		1							320	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

Now, Rearrange the rows according to their Ranks such that M/c (s) becomes of order **4 – 5 – 6 – 1 – 2 – 3 – 7 – 8**

we get,

Parts M/C	1	2	3	4	5	6	7	8	9	10	11	12	Binary weights
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							$2^2 = 4$
7					1					1		1	$2^1 = 2$
8					1					1		1	$2^0 = 1$
Decimal eq. (DE)	224	24	224	28	3	28	224	24	224	3	24	3	
Ranks	1	7	2	5	10	6	3	8	4	11	9	12	

Now, Rearrange the columns according to their Ranks such that part's order become

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

We get,

M/c \ Part	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	1	1			
2					1	1	1	1	1			
3					1	1						
7										1	1	1
8										1	1	1

⇒ These are the required cells.