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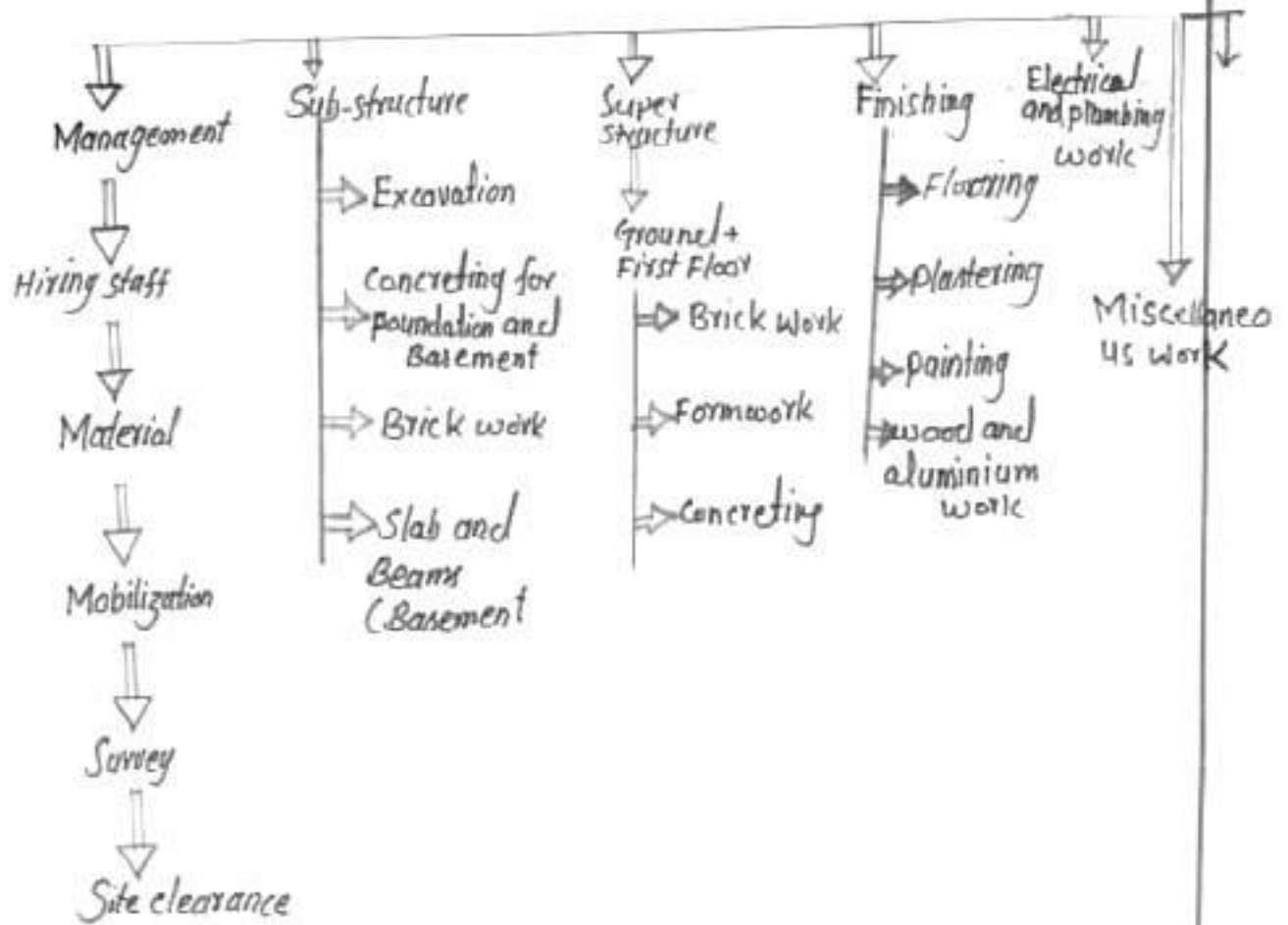
(Q = No = 01)

Solution:

(a) Activity list of a two story building:

- 1 Excavation
- 2 Layout
- 3 1:4:8/Lean concrete
- 4 pour foundation / Raft
- 5 outside plumbing
- 6 Frame House
- 7 Electric wiring
- 8 Lay floor
- 9 Lay roof
- 10 Inside plumbing
- 11 Ciling
- 12 Insulation wall and Roofs
- 13 Door and windows
- 14 Shingling
- 15 outside sheeting
- 16 Brick work
- 17 Finish Interior
- 18 Finish exterior
- 19 Water tank
- 20 Septic tank
- 21 Landscape

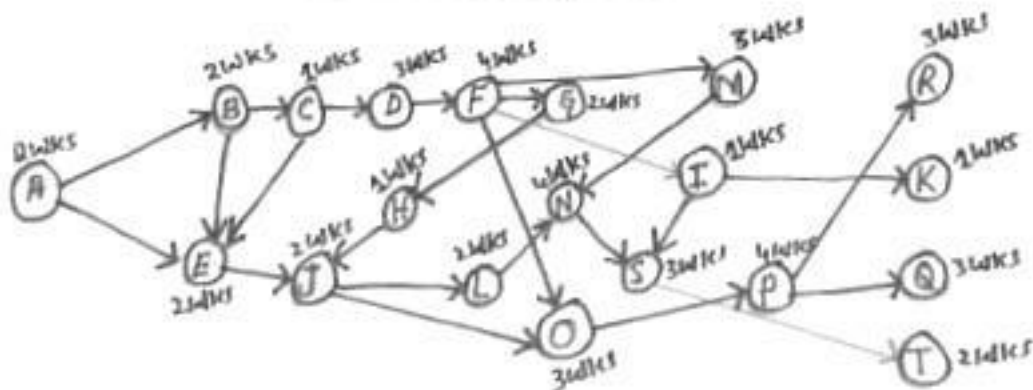
⇒ Work Breakdown Structure of building



Q = No: 03: Critical path Method of the project

Activity	Predecessors	Duration (Weeks)
A excavate	-	2
B Layout	A	2
C 1:4:8	B	1
D Pour foundation	C	3
E Outside plumbing	A-B-C	2
F Frame house	D	4
G Do electric wiring	F	2
H Lay floor	G	1
I Lay roof	F	1
J Inside plumbing	E-H	2
K Shingling	I	1
L outside sheeting	F, J	2
M Windows & Doors	F	3
N Do brick work	L, M	4
O Insulate wall & Ceiling	G, J	3
P Cover wall & Ceiling	O	4
Q Insulate roof	I, P	3
R Finish interior	P	3
S Finish exterior	I, N	3
T Landscape	S	2

Precedence Diagram



⇒ Activity Box:

ES	Activity	ES
S	Description	
LS	D	LF

ADDING Activity

1	A+B+C+D+F+G+O+P+R	$2+2+1+3+4+2+3+4+3 = 24$ weeks
2	A+B+C+D+F+G+O+P+Q	$2+2+1+3+4+2+3+4+3 = 24$ weeks
3	A+B+C+D+F+G+H+I+O+P+R	$2+2+1+3+4+2+1+2+3+4+3 = 27$ weeks
4	A+B+C+D+F+G+H+J+O+P+Q	$2+2+3+1+4+2+1+2+3+4+3 = 27$ weeks
5	A+B+C+D+F+M+N+S+T	$2+2+1+3+4+3+4+3+2 = 24$ weeks
6	A+B+C+D+F+I+K	$2+2+1+3+4+1+1 = 14$ weeks
7	A+B+C+D+F+L+N+S+T	$2+2+1+3+4+2+4+3+2 = 23$ weeks
8	A+B+C+D+F+I+Q	$2+2+1+3+4+1+3 = 16$ weeks
9	A+B+C+E+J+O+P+R	$2+2+1+2+2+3+4+3 = 19$ weeks
10	A+B+C+E+J+L+N+S+T	$2+2+1+2+2+2+4+3+2 = 20$ weeks
11	A+B+C+E+J+O+P+Q	$2+2+1+2+2+3+4+3 = 19$ weeks
12	A+B+E+J+L+N+S+T	$2+2+2+2+2+4+3+2 = 19$ weeks
13	A+B+E+J+O+P+R	$2+2+2+2+3+4+3 = 18$ weeks
14	A+B+E+J+O+P+Q	$2+2+2+2+3+4+3 = 18$ weeks
15	A+E+J+O+P+R	$2+2+2+3+4+3 = 16$ weeks
16	A+E+J+N+S+T	2 $2+2+2+4+3+2 = 15$ weeks
17	A+E+J+O+P+Q	$2+2+2+3+4+3 = 16$ weeks

→ There are two Critical paths which is highest duration

path → \Rightarrow ABCDFGHJOPR = 27 weeks

path → ABCDFGHJOPQ = 27 weeks

because it is the longest path and takes longest duration.

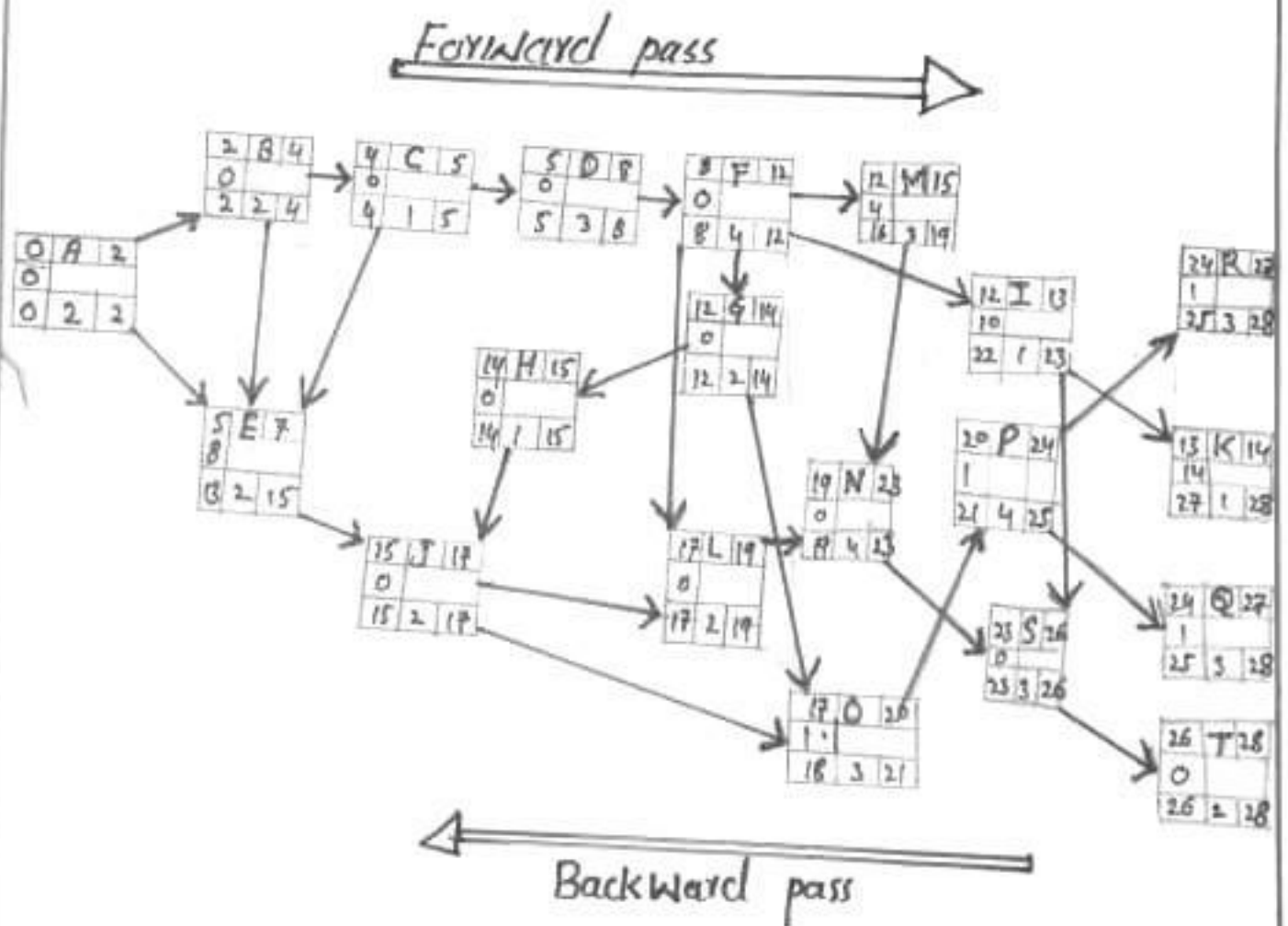
Forward and Backward Pass and Slack Time

→ Formula use for:

* Forward pass = Early Start (ES) + Duration (D)

* Backward pass = Late Finish (LF) - Duration (D)

* Slack Time = Late Start - Early Start = LS - ES or $S = LF - EF$



As an according to forward and backward pass the maximum time for our project is 28 wks

Calculation Formulas

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⇒ Forward pass:

$$1: \text{Early Finish} = EF = E.S + \text{Duration}$$

$$EF = ES + D$$

Let's Activity A:

$$\Rightarrow EF = 0 + 2 = 2$$

Same for other Activities

⇒ As for E = A, B, C So we have a choice to take greater one

⇒ For other activity like J, L, M, O, Q, S we are taking
Some procedure 1. E = A, B, C

⇒ Part (c)

Answer:-

Activity	Slack Time	Time
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⇒ 0 = No = 05 : provide Slack time for the activity if any--

$$\text{Slack} = \text{Late finish} - \text{early finish}$$

$$A = 2 - 2 = 0$$

$$B = 4 - 4 = 0$$

$$C = 5 - 5 = 0$$

$$D = 8 - 8 = 0$$

$$F = 12 - 12 = 0$$

$$G = 14 - 14 = 0$$

$$H = 15 - 15 = 0$$

$$J = 17 - 17 = 0$$

$$L = 19 - 19 = 0$$

$$N = 23 - 23 = 0$$

$$S = 26 - 26 = 0$$

$$T = 28 - 28 = 0$$

All values come zero which have no slack time

⇒ ~~Slack = Late finish - early finish~~

⇒ Slack = Late start - early start

$$A = 0 - 0 = 0$$

$$B = 2 - 2 = 0$$

$$C = 4 - 4 = 0$$

$$D = 5 - 5 = 0$$

F, G, H, J, L, N, S & T and so on all values come zero, no slack time.

G = No = 02

Time line of the building Project

S.No	Project Name	project start date	project Duration	project End date
1	Construction of 2 kanal house	1-1-2020	196 days	15-07-2020
	Activity	Start date	Duration	End date
01	Planning	1-01-2020	02	03-01-2020
02	Initiation	03-01-2020	02	05-01-2020
03	Site Selection	05-01-2020	03	08-01-2020
04	Architecture	08-01-2020	06	14-01-2020
05	Site preparation	14-01-2020	06	20-01-2020
	Basement		33	
01	Layout before excavation	20-01-2020	01	21-01-2020
02	Excavation	21-01-2020	04	25-01-2020
03	Layout After excavation	25-01-2020	02	27-01-2020
04	Concrete (1:4:8)	27-01-2020	02	29-01-2020
05	Installation of Steel	29-01-2020	04	02-02-2020
06	Column Concrete	02-02-2020	04	06-02-2020
07	Plinth	06-02-2020	03	09-02-2020
08	Beam	09-02-2020	02	11-2-2020
09	Brick work	11-2-2020	04	15-02-2020
10	Formwork Slab	15-02-2020	03	18-02-2020
11	Installation of steel	18-2-2020	01	19-2-2020
12	Roof Slab Concrete	19-02-2020	03	22-2-2020
	Ground Floor		25	
1	Installation of Steel (Column)	22-02-2020	04	26-02-2020
2	Column Concrete	26-02-2020	05	3-03-2020
3	Brick Work	03-03-2020	07	10-03-2020
4	Beam	10-03-2020	03	13-3-2020
5	Formwork Slab	13-03-2020	02	15-03-2020
6	Installation of Steel	15-03-2020	02	17-3-2020
7	Roof Slab Concrete	17-3-2020	02	19-3-2020

	1st Floor		25	
1	Installation of Steel (column)	19-03-2020	04	23-03-2020
2	Column Concrete	23-03-2020	05	28-03-2020
3	Brick work	28-03-2020	07	04-04-2020
4	Beam	04-04-2020	03	07-04-2020
5	Form work Slab	07-04-2020	02	09-04-2020
6	Installation of Steel	09-04-2020	02	11-04-2020
7	Roof Slab Concrete	11-04-2020	02	13-04-2020
	Electricity		20	
1	Pipe Fixing in Wall	13-04-2020	06	19-04-2020
2	Wire Fixing in pipe	19-04-2020	06	25-04-2020
3	Board fitting	25-04-2020	05	30-04-2020
4	point fitting	30-04-2020	03	03-05-2020
	Plumbing/Sanitary work		20	
1	Pipe fitting	03-05-2020	10	13-05-2020
2	Sanitary fitting	13-05-2020	10	23-05-2020
⇒	Sewerage System	23-05-2020	20	12-06-2020
⇒	Gas Fitting	12-06-2020	15	27-6-2020
⇒	Finishing		22	
01	Plaster	27-6-2020	11	08-07-2020
02	Paints	08-07-2020	7	15-7-2020