

**Federal Urdu University Of Arts, Science and Technology
Admit Card**

Department	Computer Science	Faculty:	Science	Semester/Batch: B.S. 4 - Batch-17 Regular
Examinations:	December 2020	Examinations Held In:	February 2021	Shift: Morning
Seat No:	17122025	Enrollment no:	GC/2/02204 /M/CS/2019	

Name:	SANA	
Father Name:	MUHAMMAD ASLAM CHOOHAN	
Address:	Vill: Chaheen Manomal, Talka Bhiria, District Naushahro Feroze, Sindh	

Subjects

English-I (English Composition & Comprehension)(HUM-301)

Linear Algebra(CS)

Theory of Automata(CSC-504)

Financial Accounting(FIN-)

Design Analysis of Algorithm(CSC-)

Dated: 15/February/2021 01:40 | Checked by:

Print By: System Generated.

Federal Urdu University of Arts, Science and Technology, Karachi

Online Examination February, 2021

Name: Sana

Father's Name: Muhammad Aslam

Seat No: 17122025

Enrolment No: GC/2/02204/M/CS/2019

Major Department: Science

Department: Computer Science

Class : BS

(Regular\Repeater)

Morning/Evening

Course: Design Analysis of Algorithm

Date : 3/3/2021

(1)

Sana Aslam Seat no: 17122025

Date _____ 20 _____

Sol.. Question 1

- (a) $O(n^2)$
- (b) $O(n \log n)$
- (c) $O(n \log n)$
- (d) $O(n^2 \log n)$
- (e) $O(\sqrt{n})$
- (f) $O(n^5)$
- (g) $O(n)$
- (h) $O(n)$

Ans -

Question 3

Data

Your solution will be graded for clarity and simplicity in addition to correctness.

Length = 70, Total size $8 \times 70 = 560$ bits

Sol.:

Fixed Length :-

character	frequency	Code
Y	3	00000
O	7	00001
U	2	00010
R	6	00011
S	4	00100
L	5	00101
T	6	00110
I	9	00111

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Date 20

N	5	01000
W	1	01001
B	1	01010
E	4	01011
G	1	01100
A	4	01101
D	5	01110
F	1	01111
C	4	10000
M	1	10001
P	1	10010

Decode

Y	00000
O	00001
U	00010
R	00011
S	00100
L	00101
T	00110
I	01000 00111
N	01001 01000
W	01010 01001
B	01011 01010
E	01100 01011
G	01101 01100
A	01110 01101
D	01111 01110
F	10000 01111
C	10001
M	10010
P	10010

(3)

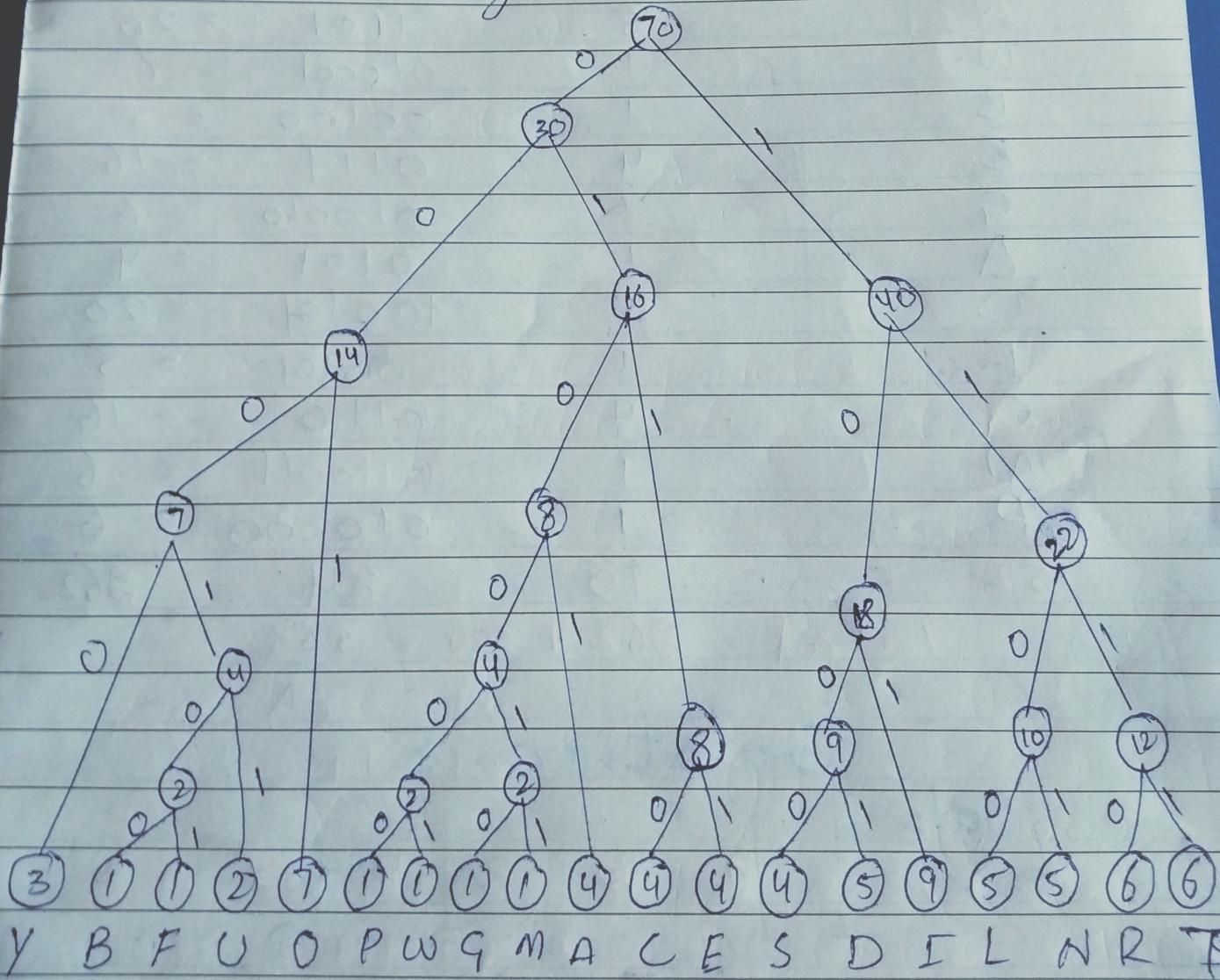
Date _____ 20 _____

$$19 \times 8 = 152$$

$$19 \times 5 = 95$$

Message of decoding table

- Size of Message = 350
- Decode table = 247
- Total size = 597 bits



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Date _____ 20 _____

char	freq	code	
Y	3	0000	= 12
O	7	0001	= 21
U	2	0001	= 8
R	6	1110	= 24
S	4	1000	= 16
L	5	1100	= 20
T	6	1111	= 24
I	9	101	= 27
N	5	1101	= 20
W	1	010001	= 6
B	1	00100	= 5
E	4	0111	= 16
G	1	010010	= 6
A	1	0101	= 4
D	5	100101	= 20
F	1	00101	= 5
C	4	0110	= 16
M	1	010011	= 6
P	1	010000	= 6
<u>152</u>	<u>70</u>	<u>84</u>	<u>262</u>

$$\text{Total } 262 + 306 = 568$$

Ans -

Question 5

Sol.:

1	2	3	4	5
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J ₆	J ₈	J ₁	J ₂	J ₃
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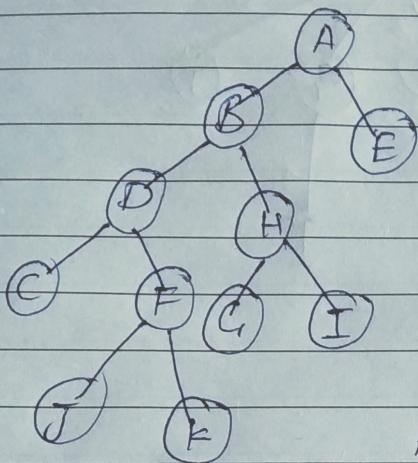
$$50 + 45 + 35 + 45 + 25 = 200 \text{ Ans}$$

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Date _____ 20 _____

Question No 2

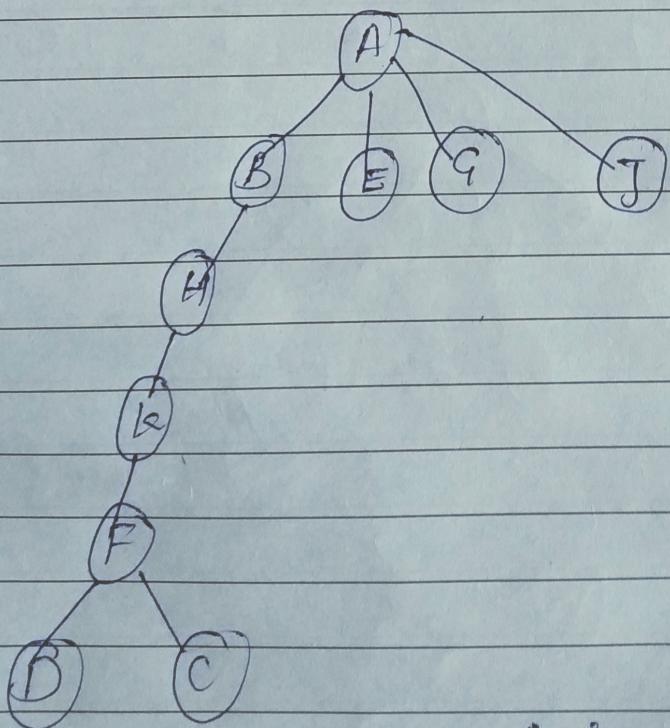
(a) DFS tree start at Node A



Ans -

Q no 2 (b)

BFS tree start at node A

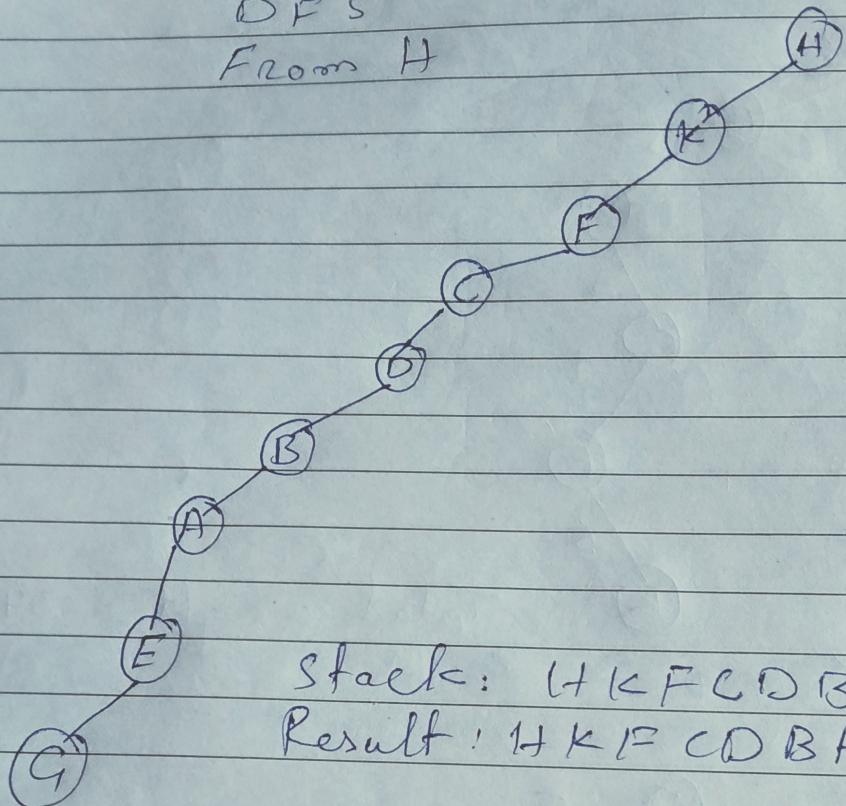


Ans.

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Q No 2 (c)

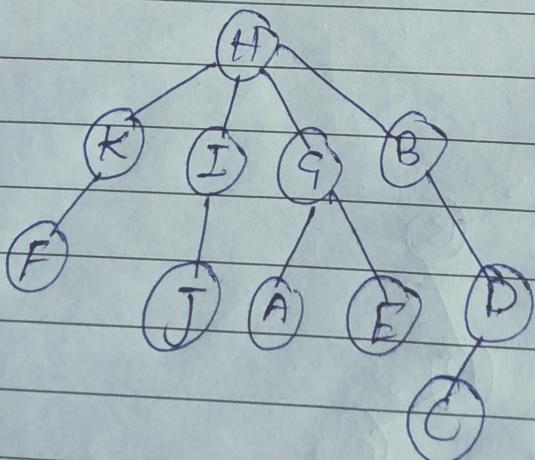
DFS
From H

Stack: HKFCDBAEGJ
 Result: HKFCDBAEGJ

Ans -

Q 2 (d)

BFS tree start at node H

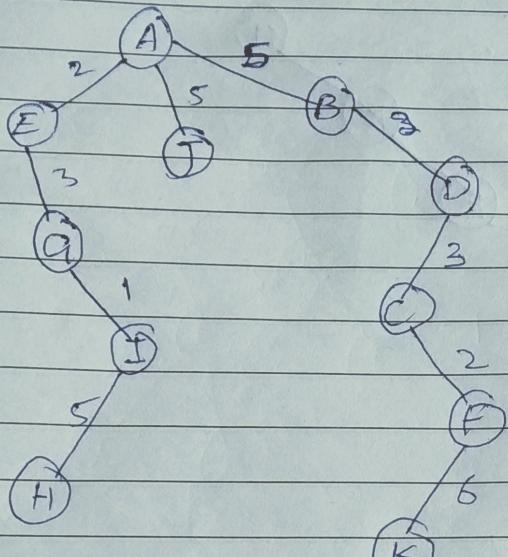
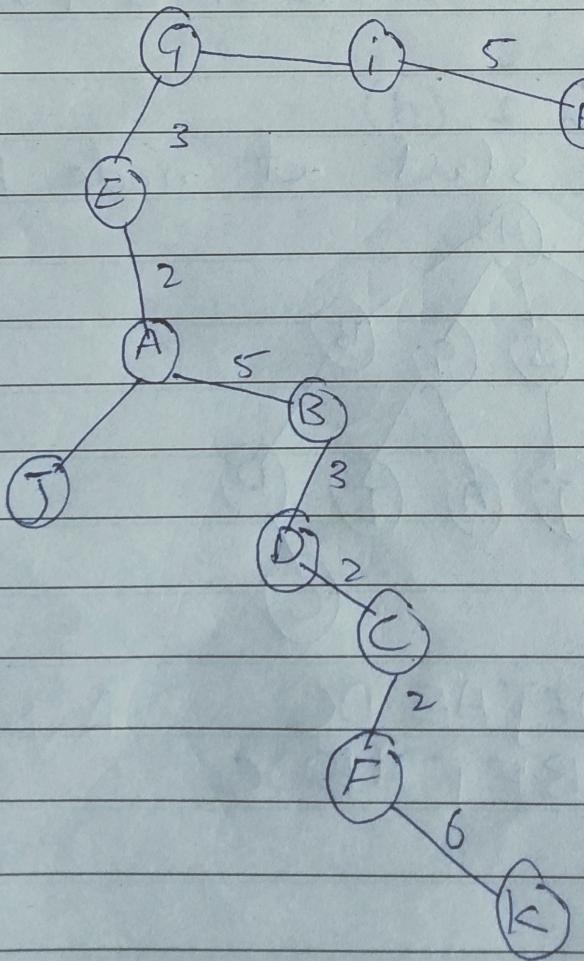


Queue = HKIGBFJAE DC
 Result = HKIGBFJAE DC

Ans -

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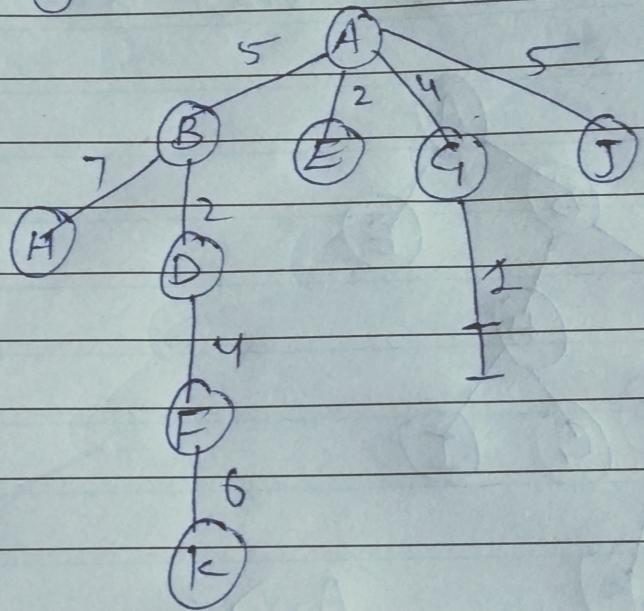
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Q No 2
(f)Total weight = 34
Q No 2 (e)

⑧

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Q2(g)
using Dijkstra's Algorithm



The path $A \rightarrow G \rightarrow I$ for a cost 5. This is the last vertex.

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Q 4 a

$$\text{Profit} = \{10, 5, 15, 17, 6, 18, 13\}$$

$$\text{Weight} = \{2, 3, 5, 7, 1, 4, 1\}$$

$w = 15$ greater than

P_i	w_i
6	1
10	2
5	3
18	4
15	5
13	1
17	7

w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
3	0	6	10	16	16	16	16	16	16	16	16	16	16	16	16	16	16
4	0	6	10	16	18	24	28	34	34	34	39	39	39	39	39	39	39
5	0	6	10	16	18	24	28	34	34	34	39	39	39	39	39	54	54
6	0	13	19	23	29	31	37	41	47	47	52	52	62	62	62	67	67
7	0	13	19	23	29	31	37	41	47	47	52	52	62	62	62	67	67

(b)

	O_1	O_2	O_3	O_4	O_5	O_6	O_7
P	10	5	15	7	6	18	3
w	2	3	5	7	1	4	1
P/w	5	5/3	3	1	6	4.5	3

$$P = 6 \longrightarrow 15 - 1 = 14$$

$$P = 10 \longrightarrow 14 - 2 = 12$$

$$P = 18 \longrightarrow 12 - 4 = 8$$

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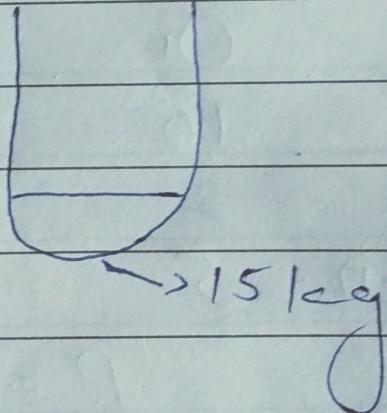
$$P = 15 \rightarrow 8 - 5 = 3$$

$$P = 3 \rightarrow 3 - 1 = 2$$

$$\begin{array}{r} P = 5 \times 2 \\ \hline 3 \end{array} \rightarrow 2 - 2 = 0$$

$$\begin{array}{r} + \\ \hline P = 55.33 \end{array}$$

Ans



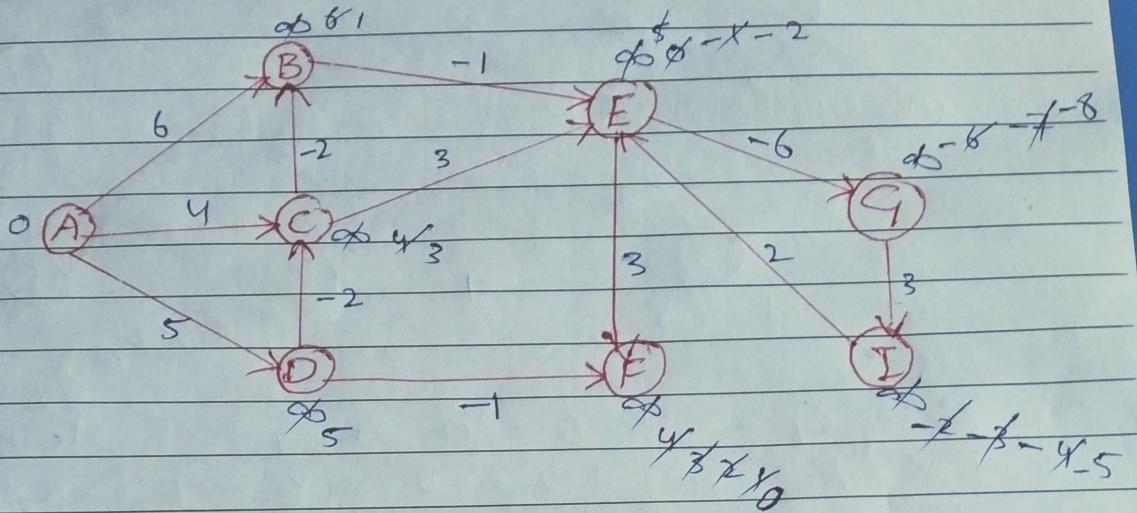
nicE

Teacher's Signature _____

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Date _____ 20 _____

Question 7



Now Relaxing all edges $(n-1)$ times

Edges:.. $(A, B), (A, C), (A, D), (B, E), (C, B), (C, E),$
 $(D, C), (D, F), (E, F), (F, G), (G, I), (I, E)$

Iterations.

$$A \rightarrow B = 6 < \infty, \quad B \rightarrow E = 6 - 1 = 5 < \infty$$

$$A \rightarrow C = 4 < \infty, \quad D \rightarrow C = 5 - 2 = 3 < 4$$

$$A \rightarrow D = 5 < \infty, \quad D \rightarrow F = 5 - 1 = 4 < \infty$$

$$E \rightarrow G = 5 - 6 = -1, \quad G \rightarrow I = -1 + 3 = 2$$

$$I \rightarrow E = 2 + 2 = 4, \quad E \rightarrow F = 4 + 3 = 7$$

$$C \rightarrow B = 3 - 2 = 1, \quad B \rightarrow E = -3 + 2 = -1$$

$$E \rightarrow F = 0 + 3 = 3, \quad E \rightarrow G = 0 - 6 = -6$$

$$G \rightarrow I = -6 + 3 = -3, \quad I \rightarrow E = -3 + 2 = -1$$

$$E \rightarrow F = -1 + 3 = 2, \quad E \rightarrow G = -1 - 6 = -7$$

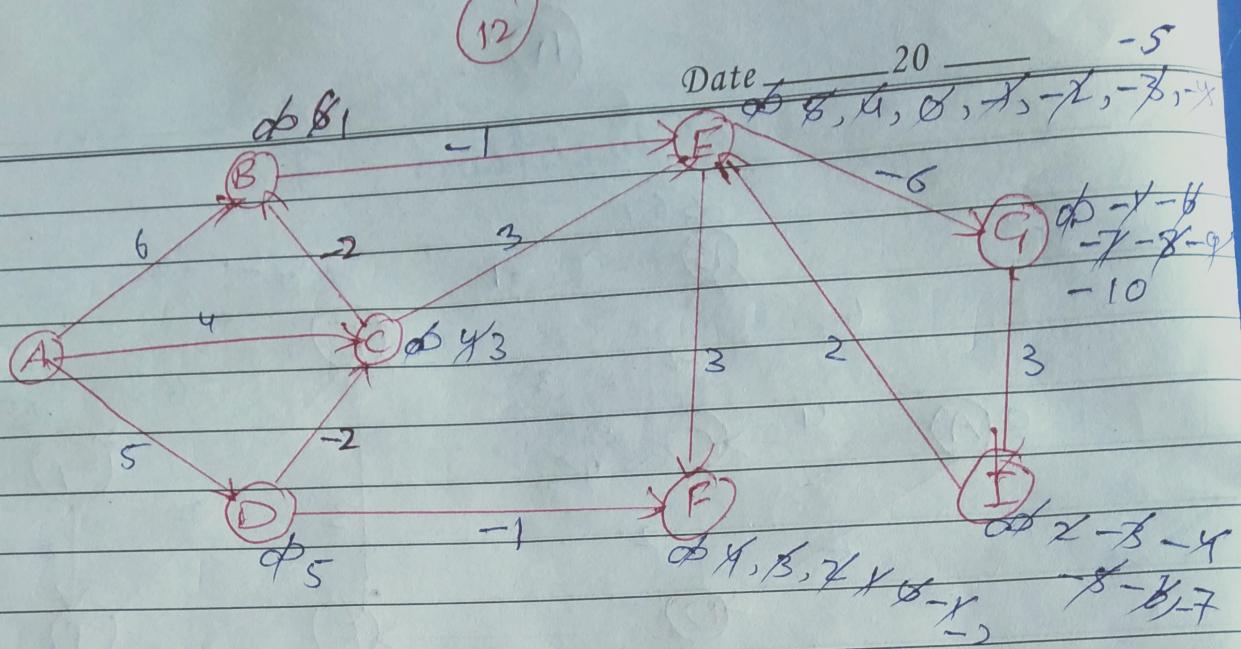
$$G \rightarrow I = -7 + 3 = -4, \quad I \rightarrow E = -4 + 2 = -2$$

$$E \rightarrow F = -2 + 3 = 1, \quad E \rightarrow G = -2 - 6 = -8$$

$$G \rightarrow I = -8 + 3 = -5, \quad I \rightarrow E = -5 + 2 = -3$$

$$E \rightarrow F = -3 + 3 = 0, \quad$$

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$$E \rightarrow G = -4 - 6 = -10, \quad G \rightarrow I = -10 + 3 = -7$$

$$I \rightarrow F = -7 + 3 = -4, \quad E \rightarrow F = -5 + 3 = -2$$

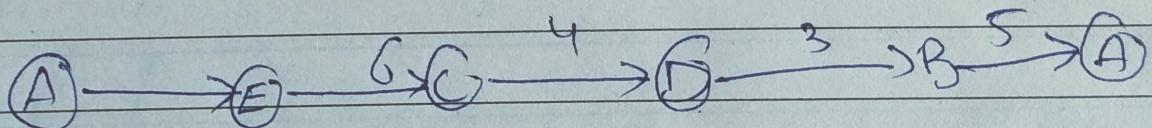
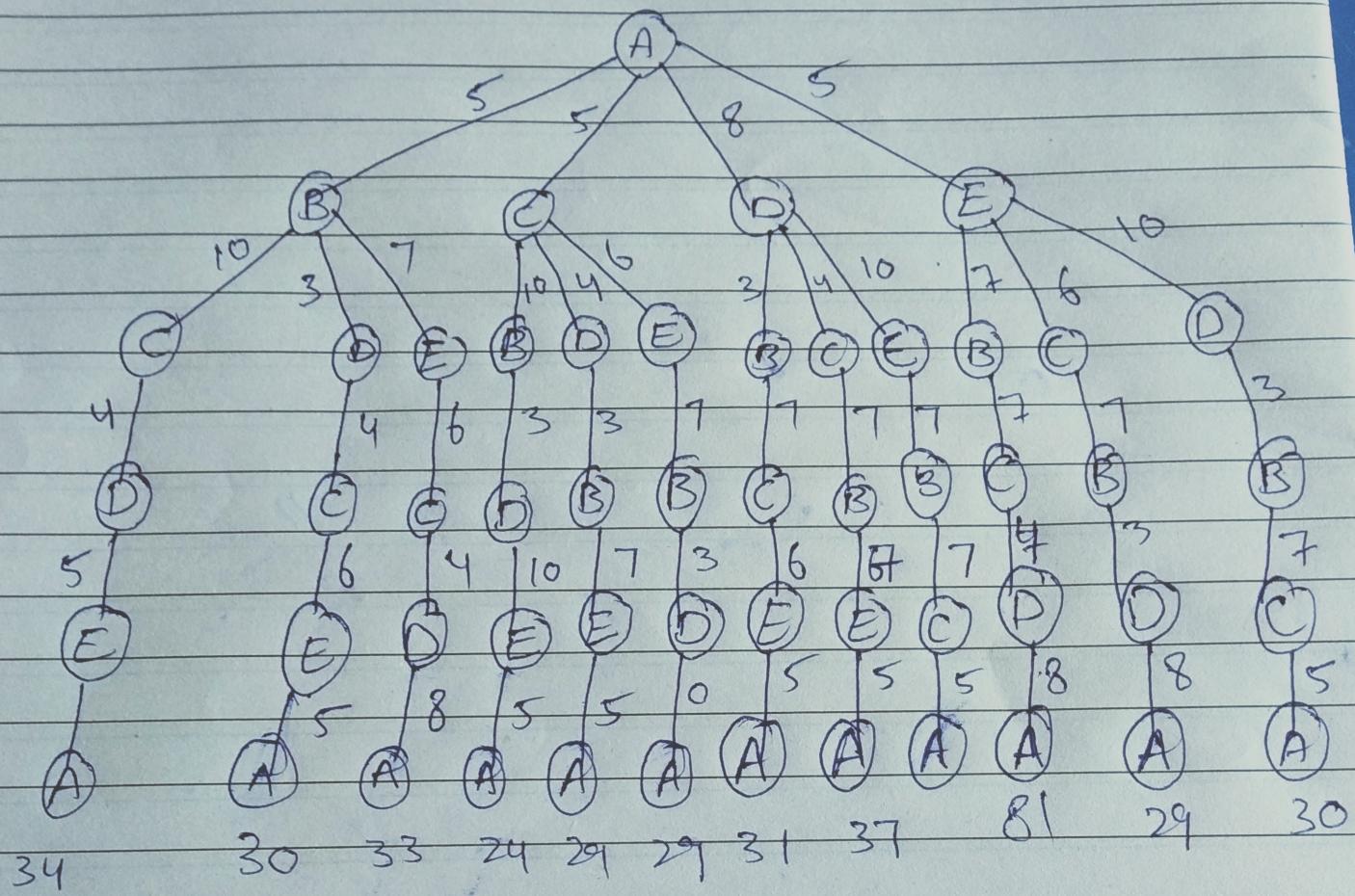
Drawback

Negative weight cycle -
 Bellman Ford will not work a graph contains any negative weight cycle -
 Ans.

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Date 20

Q no 6



Ans -