امتحان Covid-19 کے بارے میں حکومتی پالیسی کے تحت منعقد ہوگا۔ امتحان کا طریقہ کار روایتی ہوگا۔ امتحان حکومت کے جاری کردہ (SOP's) کے تحت ہوگا۔

میں درج بالا تحریر سے متفق ہوں۔

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:	Februrary 2021	Shift:	Morning
Seat No:	17122116	Enrollment no:	GC/2/02267/M/CS/2019		

Name: QADEER HUSSAIN

Father Name: MUHAMMAD QAIS

Address: flat#1,society firozabad colony nazimabad#2 khi

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 10:37	Checked by:	Print By: System Generated.

Federal Urdu University of Arts, Science and

Technology, Karachi

Gulshan-e-Iqbal Campus, -

Online Examination, 2021

Name: Qadeer Hussain

Father's Name: Muhammad Qais

Seat No: 17122116 Enrolment No: GC/2/02267/M/CS/2019

Major Department: Science & Technology

Department: Computer Science

Class : BS (Regular) Morning

Course : Design Analysis of Algorithm

Date : March 3, 2021

Question No :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) $o(n)$

Question No: 3

Data

yoursolutionwillbegradedforclarityandsimplicityinadditiontocorrectness.

Length = 70 , Total Size = 8×70 = 560 bits

Solution! ★

FIXED LENGTH

CHARACTER	FREQUENCY	CODE
y	3	00000
o	7	00001
u	2	00010
~~b~~	6	00011
s	4	00100
l	5	00101
t	6	00110
i	9	00111
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

length = 70x5 = 350

DECODING:-

y	00000
o	00001
u	00010
r	00011
s	00100
l	00101
t	00111
i	01000
n	01001
w	01010
b	01011
e	01100
g	01101
a	01110
d	01111
f	10001
c	10010
m	
p	
19x8=152	19x5=95

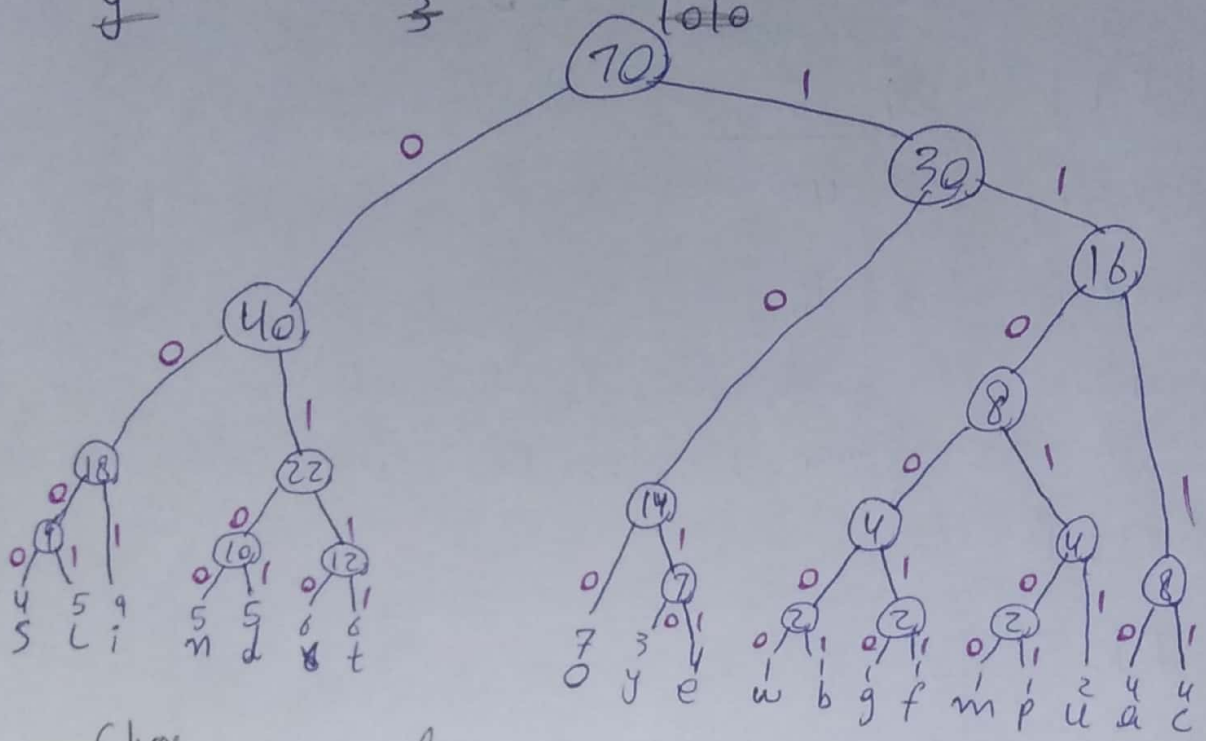
Message of decoding table

- Size of message : 350
- Decode table : 247
- Total size : 597 bits

(3)

~~Character~~ ~~freq~~ ~~code~~

~~y~~ ~~3~~ ~~1010~~



Char	freq	code	
y	3	1010	= 12
O	7	100	= 21
U	2	11011	= 10
x	6	0110	= 24
S	4	0000	= 16
L	5	0001	= 20
t	6	0111	= 20
i	9	001	= 27
n	5	0100	= 20
w	1	110000	= 6
b	1	110001	= 6
e	4	1011	= 16
g	1	110010	= 6
a	4	1110	= 16
d	5	0101	= 20
f	1	110011	= 6
c	4	1111	= 16
m	1	110100	= 6
p	1	110101	= 6
	152 bits	70	87 bits 274

Total = 274 + 239 = 513 bits Ans

Question No:- 5

Jobs	J_1	J_2	J_3	J_4	J_5	J_6	J_7	J_8	J_9
Profits	35	45	25	20	15	50	23	45	21
Deadlines	3	4	5	4	2	1	3	2	1

Value of maximum deadline = 5

Sort all the given jobs in the decreasing order of their profits.

Jobs	J_6	J_8	J_2	J_1	J_3	J_7	J_9	J_4	J_5
Profits	50	45	45	35	25	23	21	20	15
Deadlines	1	2	4	3	5	3	1	4	2

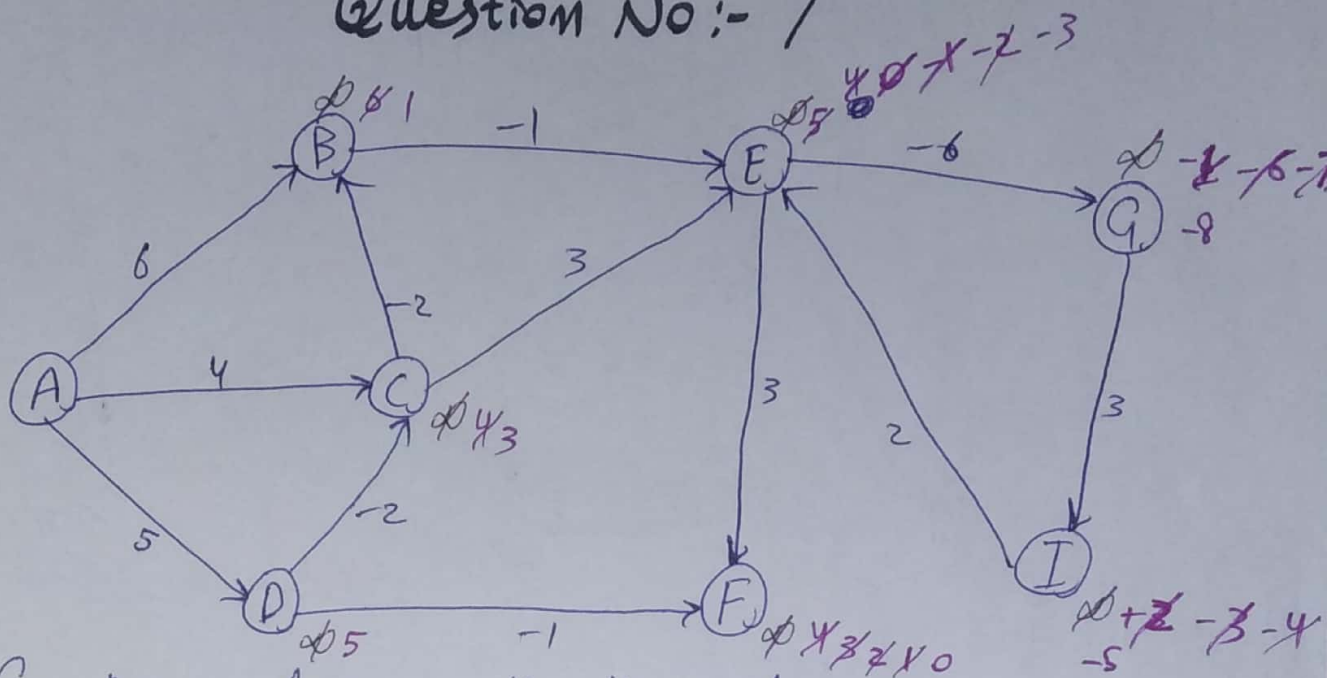
1	2	3	4	5
J_6	J_8	J_1	J_2	J_3

Profit = 50 + 45 + 35 + 45 + 25

Profit = 200

Ans/

Question No:- 7

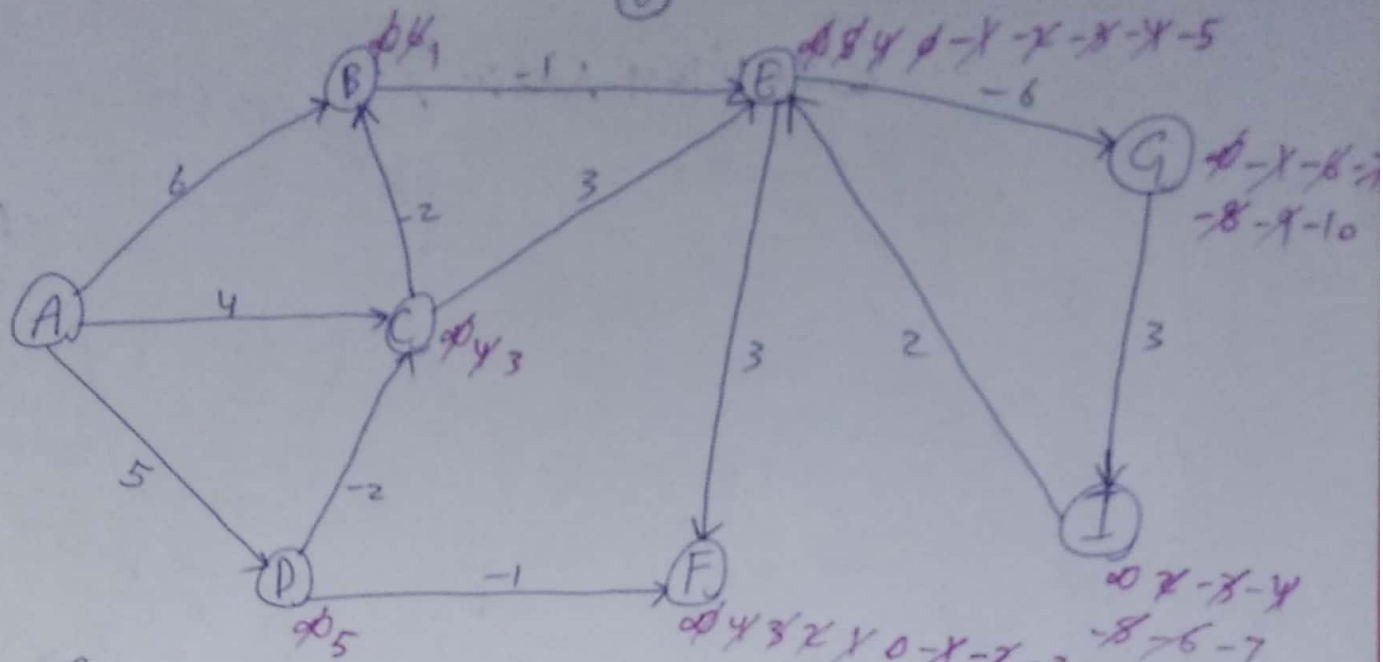


*) Go on relaxing all the edges n-1 times

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

Iterations

- A→B = 6 < ∞ ; B→E = 6-1 = 5 < ∞
- A→C = 4 < ∞ ; D→C = 5-2 = 3 < 4
- A→D = 5 < ∞ ; D→F = 5-1 = 4 < ∞
- E→G = 5-6 = -1 ; G→I = -1+3 = 2
- I→E = 2+2 = 4 ; E→F = 4+3 = 7 Not okay.
- C→B = 3-2 = 1 ; B→E = 1-1 = 0
- E→F = 0+3 = 3 ; E→G = 0-6 = -6
- G→I = -6+3 = -3 ; I→E = -3+2 = -1
- E→F = -1+3 = 2 ; E→G = -1-6 = -7
- G→I = -7+3 = -4 ; I→E = -4+2 = -2
- E→F = -2+3 = 1 ; E→G = -2-6 = -8
- G→I = -8+3 = -5 ; I→E = -5+2 = -3
- E→F = -3+3 = 0 ; E→G = -3-6 = -9
- G→I = -9+3 = -6 ; I→E = -6+2 = -4
- E→F = -4+3 = -1



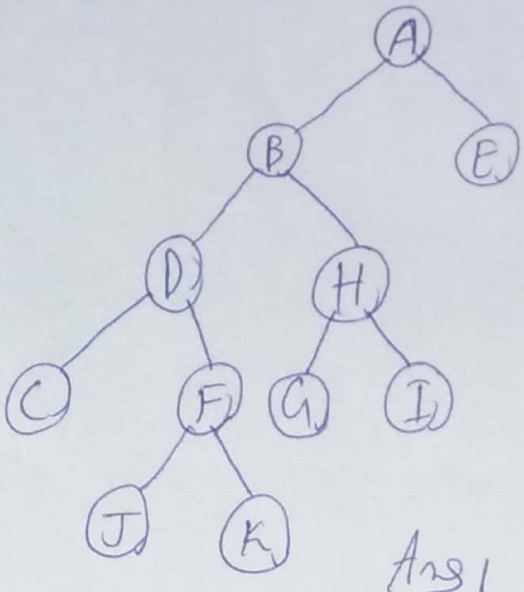
-) E → G = -4-6 = 10 ; G → I = -10+3 = -7
-) I → E = -7+2 = -5 ; E → F = -5+3 = -2

Drawback

Negative weight cycle found:
Bellman ford will not work a graph contains any negative weight cycle.

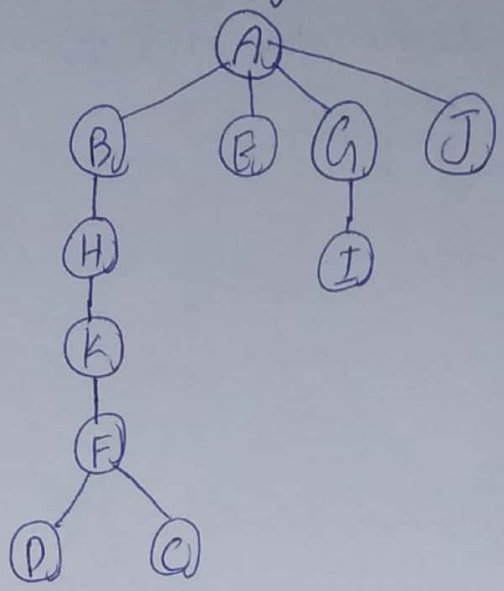
Question No: 2

(a) DFS tree starting at node A.

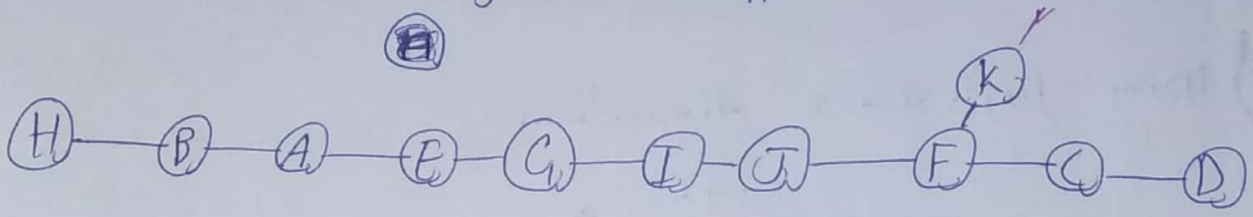


Ans!

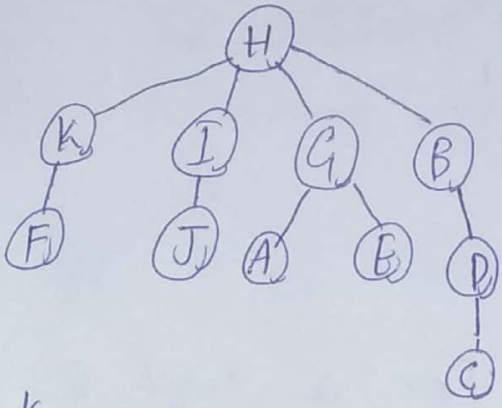
(b) BFS tree starting at node A



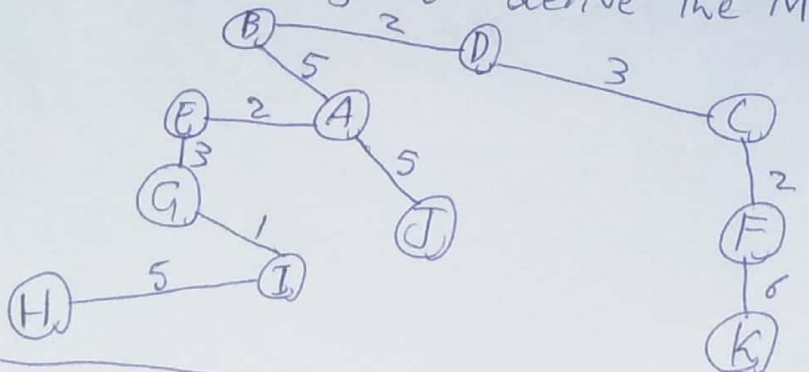
c) DFS tree starting at Node H



D) BFS tree starting at node H



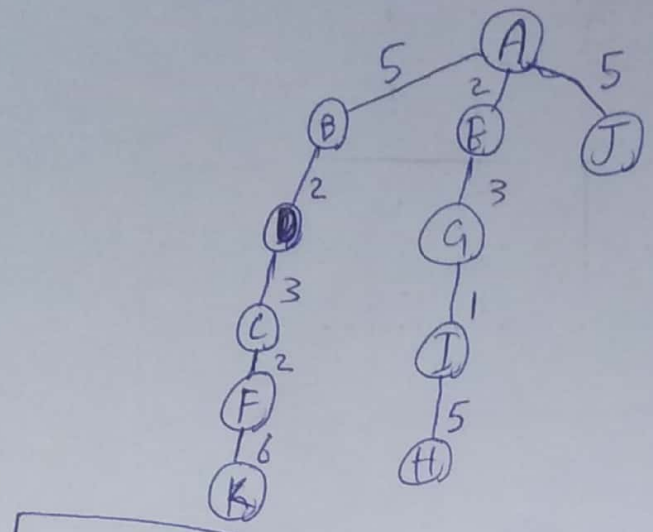
e) use Kruskal's Algo to derive the MST.



Total weight = 34

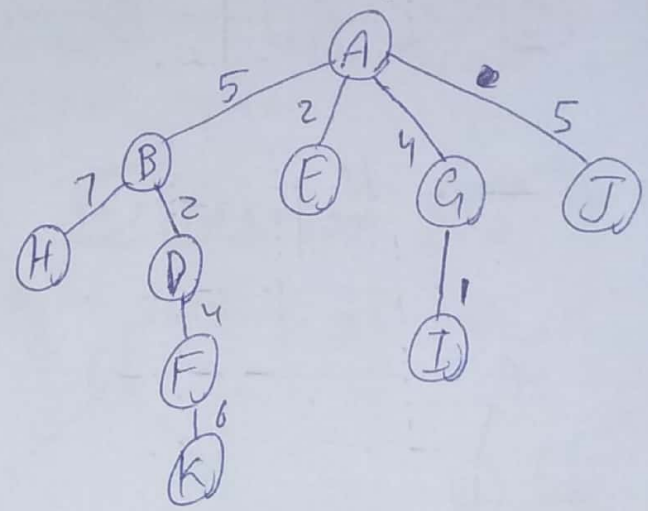
f) ~~use prim's algorithm, determine the shortest path~~

use Prim's algorithm to derive the MST starting at Node A.



Total weight = 34

g) Using Dijkstra's Algorithm.



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

Question No: 4

Weight = 15

Objects	1	2	3	4	5	6	7
Profits	10	5	15	17	6	18	13
Weight	2	3	5	7	1	4	1
Ratio	5	1.6	3	2.4	6	4.5	13

Sort in desending order

objects	5	1	6	3	4		
Profits	6	10	18	15	17		
weight	1	2	4	5	7		
Ratio	6	5	4.5	3	2.4		

objects	7	5	1	6	3	4	2
Profit	13	6	10	18	15	17	5
weight	1	1	2	4	5	7	3
Ratio	13	6	5	4.5	3	2.4	1.6

7	5	1	6	3	4	2
1	1	1	1	1	2/3	0

Weight = {2, 3, 5, 7, 1, 4, 1}

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

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

i \ w	1	2	3	4	5	6	7	18	9	10	11	12	13	14	15
i	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	6	6	6	6	6	6	6	6	6	6	6	6	6	6
2	0	6	10	16	16	16	16	16	16	16	16	16	16	16	16
3	0	6	10	16	16	21	21	21	21	21	21	21	21	21	21
4	0	6	10	16	18	24	28	34	34	34	39	39	39	39	39
5	0	6	10	16	18	24	28	34	34	34	39	39	39	54	54
6	0	13	19	23	29	31	37	41	47	47	52	52	62	67	67
7	0	13	19	23	29	31	37	41	47	47	52	52	62	62	67

(10)

4(b):

	O_1	O_2	O_3	O_4	O_5	O_6	O_7
P	10	5	15	17	6	18	13
W	2	3	5	7	1	4	1
P/W	5	5/3	3	2.4	6	4.5	13

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

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

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

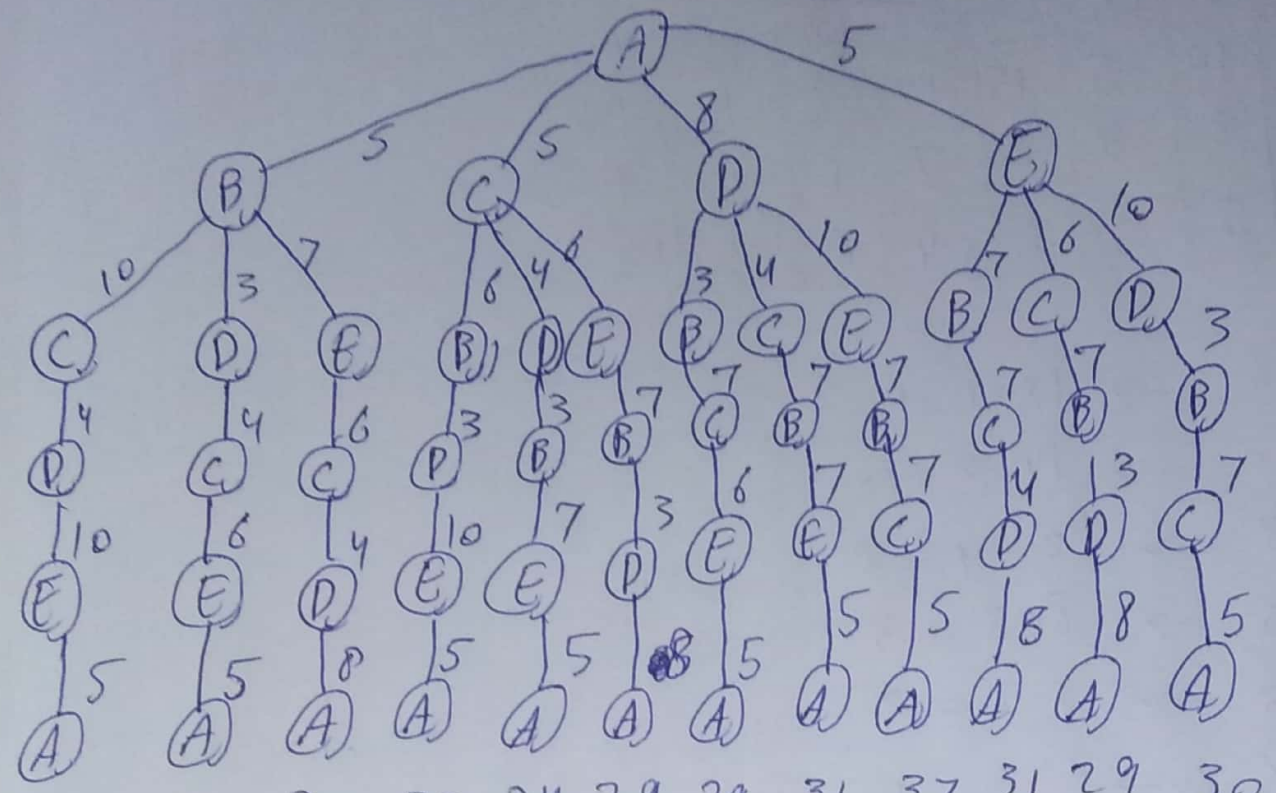
$P = 15 \rightarrow 8 - 5 = 3$

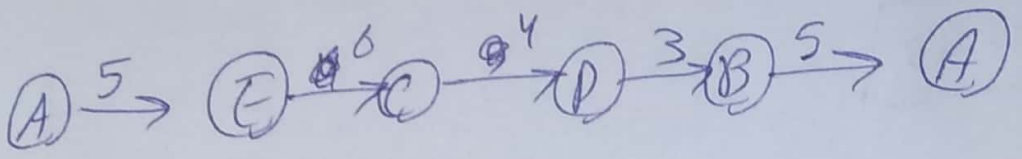
$P = 3 \rightarrow 3 - 1 = 2$

$P = 5/3 \times 2 \rightarrow 2 - 2 = 0$

$P = 55.33$

Question No:-6





=23

This is a shortest Distance