DAIICT Sample Paper

* Solution *

(1) Two dice. Odd follows even. Total = 36

$\therefore$ (2,1) (2,3) (2,5)
(4,1) (4,3) (4,5)
(6,1) (6,3) (6,5)

$\Rightarrow$ $9/36 = \boxed{0.25}$

(2) $f_x(x) = \begin{cases} K & , a \leq x \leq b \\ 0 & , \text{Otherwise} \end{cases}$

$a = -1$ and $b = 2$.

Since it is uniform distribution, the area under the probability density function will be 1.

$$\therefore \int_{-1}^{2} K\,dx = 1$$

$$\therefore [Kx]_{-1}^{2} = 1$$

$$\therefore 2K - (-1K) = 1$$

$$\therefore 3K = 1$$

$$\therefore K = 1/3$$

Now, for range $|x| \leq 1/2$,

$$\therefore -1/2 \leq x \leq 1/2$$

Compute Probability :

$$P(|x| \leq 1/2) = \int_{-1/2}^{1/2} f(x)(x)\,dx = \int_{-1/2}^{1/2} \frac{1}{3}\,dx$$

$$= \left[\frac{1}{3}x\right]_{-1/2}^{1/2}$$

$$= \boxed{1/3}$$

Q(3)

Plant A	Plant B
60 %.	40 %.
↓	↓
80 % of 60 % are Standard quality	90 % of 40 % are Standard quality

$P(A) = 6/10$

$P(B) = 4/10$

$P(S) =$ Standard.

$P(S/A) = 8/10$, $P(S/B) = 0.9$

NOTES

Find $P(A/S) = \dfrac{P(A) * P(S/A)}{P(A) * P(S/A) + P(B) * P(S/B)}$

$$= \frac{0.8 \times 0.6}{(0.8 \times 0.6) + (0.9)(0.4)}$$

$$= \frac{48}{84}$$

$$= \boxed{4/7}$$

Q(4) **Median** is in the center.

Q.(5) x is $n \times 1$

$\therefore x^T$ is $1 \times n$

Now, $A = x \cdot x^T$

$\therefore A$ is $\boxed{n \times n}$ matrix

x is non-zero $\Rightarrow$ It has atleast 1 non-zero entry

The xx^T is $\boxed{\text{Rank 1}}$ matrix because all rows are linearly dependent on x.

Short Trick:

for square matrices having non-zero determinant,

$$\text{Rank} = \frac{\text{no. of rows}}{\text{no. of columns}} = 1.$$

NOTES

Long Trick:

To find rank of matrix, convert it to Row Echelon form (REF) and count Non zero rows.

Q(6) $y = 5\cos(2x)$

because, for $x = 0$ it gives $y = 5$.

also,

$$\frac{d^2y}{dx^2} = -20\cos(2x) = -4y$$

$a = 3, b = 1, c = 2$.

Q(7) $f_1(a, b) \rightarrow$ has no effect.

$f_2(\&b, \&c) \rightarrow$ swaps b and c.

$\therefore a = 3, b = 2, c = 1.$

$\therefore c + a - b = 1 + 3 - 2$

$= \boxed{2}$

Q(8). Understanding Pointers

$a = [5, 6, 7, 8, 9]$

$a + 0 = \&a[0] = 5$

$a + 1 = \&a[1] = 6$

$a + 2 = \&a[2] = 7$

$a + 3 = \&a[3] = 8$

$a + 4 = \&a[4] = 9$

$\therefore p[] = [8, 9, 6, 7]$

$\therefore **ptr = p \rightarrow ptr = p \rightarrow$ Points to $p[0] = 8$

$ptr++ = \boxed{9}$

Q(9) 3 1 2 2 1 3 4 4 4

Q(10) const

Q(11) condition ? if true : if false.

∴ 3

Q(12) Stack is used to implement recursion.

Q(13) Good Question.

front goes forward till the x^{th} node.

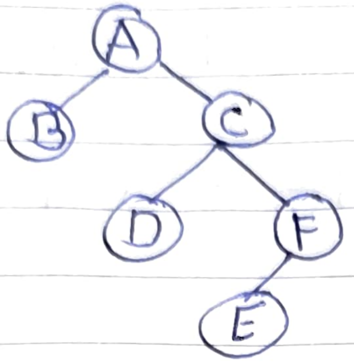
after the x^{th} node, from $(x+1)^{th}$ node both front and head goes forward.

Now, when front reaches to the end, n^{th} node, the head will be at $(n-x+1)^{th}$ node, which is x^{th} node from the end of the list.

NOTES

9:00

Q(14)



Pre : ABCDEF
in : BADCFE
Post : BDFECA

10:00

11:00

12:00

Q(15) Two ways to build a heap:

1:00

(i) insert one by one : $O(n \log n)$

2:00

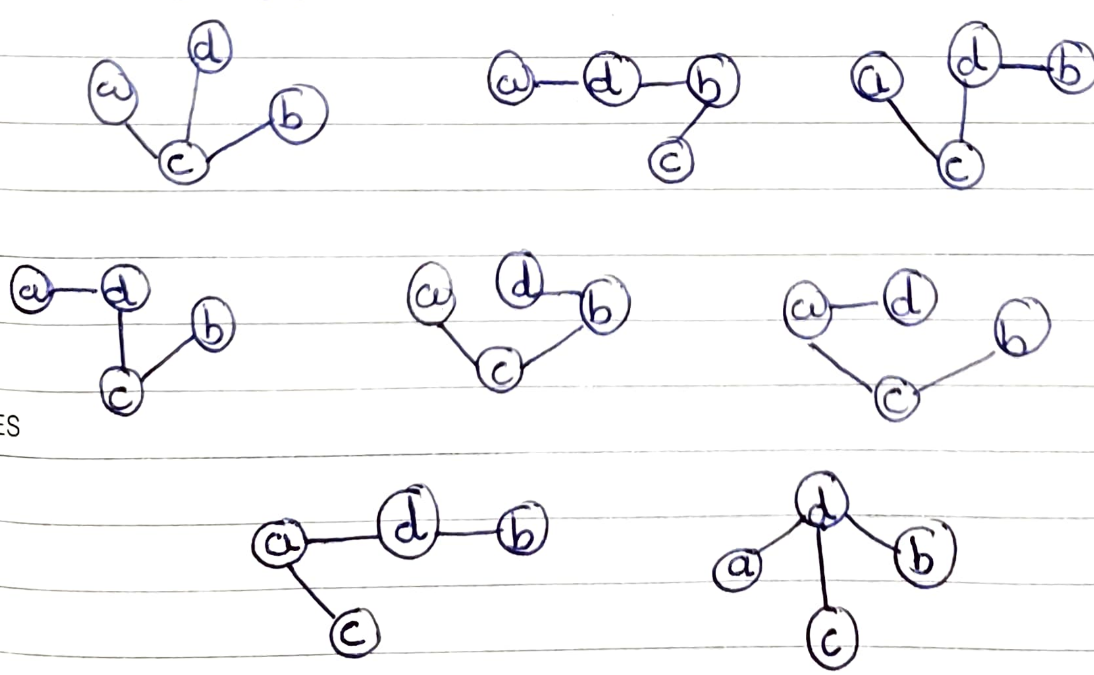
(ii) Bottom-up heapify : $\boxed{O(n)}$

3:00

4:00

Q(16) A spanning Tree of a graph with n vertices has $n-1$ edges that connects all the n vertices.

5:00



= $\boxed{8}$

NOTES

JUNE
JULY
AUGUST

Q(17) $A \cup B = A + B - A \cap B$

$\therefore A \cup B + A \cap B = A + B$

Q(18) Tshirt Shirt Socks

(Tshirt, Shirt → Same; Socks → 5)

$5 \times 1 \times 5 = \boxed{25}$

Q(19) $n!$

Q(20) ✓ reflexive with atleast 3. (aa, bb, cc)

X Symmetric (empty relation is symmetric)

X transitive (empty or one element can have)