GTNS Assignment

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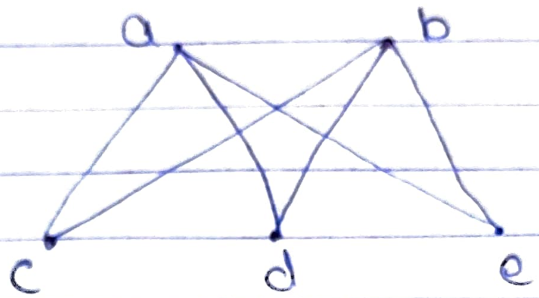
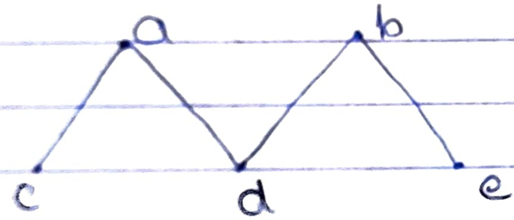
Roll no : A - 58

Q.1. Draw all the spanning tree of the given graphs.

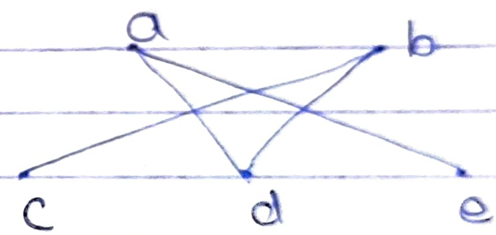


Ans.

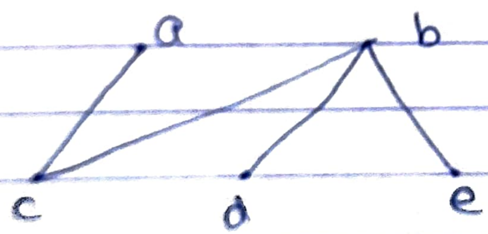
①



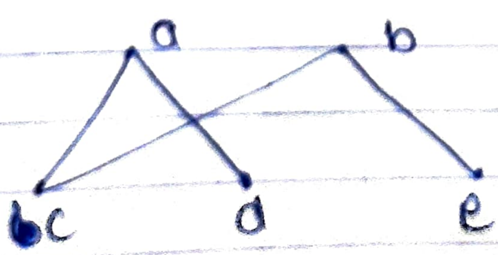
④



②



③



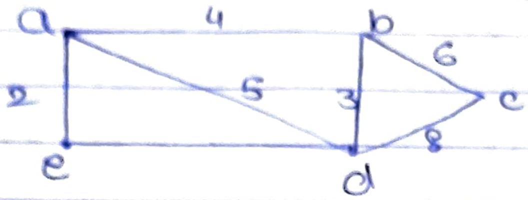
Total vertices = 6

Min. no. of vertices required $= {}^{6}C_{4}$

$$= \frac{6!}{4!\,2!}$$

$$= 15.$$

Q2. Using Krushkal's algorithm, find minimum spanning tree for given figure.



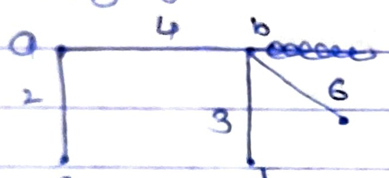
Soln

$a - e = 2$ $\quad a - d = 5$ $\quad e - d = 10$

$b - d = 3$ $\quad b - c = 6$

$a - b = 4$ $\quad c - d = 8$

Applying Krushkal's algo,



Minimum spanning tree $= 2 + 4 + 3 + 6 = 15$

Q3. Find the sq. generated.

Soln.

a) $\dfrac{4x}{1-x} = 0, 4, 4, 4, 4, \ldots$

~~b)~~ ~~dx~~

b) $\dfrac{1}{1-4x} = 1, 4, 16, 64, 256, \ldots$

c) $\dfrac{x}{1+x} = 0, 1, -1, 1, -1, 1, \ldots$

d. $\dfrac{3x}{(1+x)^2} = 0, 3, -6, 9, -12, 15, -18, \ldots$

Q. 4.

Sol^n: (1) $4, 4, 4, 4, \ldots$

The generating fn. for $1, 1, 1, 1, \ldots$ is $\dfrac{1}{1-x}$

$\therefore$ Generating fn. for $4, 4, 4, 4, \ldots$ is $\dfrac{4}{1-x}$

(2) $2, 4, 6, 8, 10, \ldots$

Let $A = 2 + 4x + 6x^2 + 8x^3 + 10x^4 + \ldots$

$$-xA = 0 + 2x + 4x^2 + 6x^3 + 8x^4 + 10x^5 + \ldots$$

$$(1-x)A = 2 + 2x + 2x^2 + 2x^3 + 2x^4 + \ldots$$

And we know that,

$$2 + 2x + 2x^2 + 2x^3 + 2x^4 + \ldots = \frac{2}{1-x}$$

Thus,

$$(1-x)A = \frac{2}{1-x}$$

or $$A = \frac{2}{(1-x)^2}$$

(3)

(3) $0, 0, 0, 2, 4, 6, 8, 10, \ldots$

Soln. Let $A = 0 + 0x + 0x^2 + 2x^3 + 4x^4 + \ldots$

$-xA = 0 + 0x + 0x^2 + 0x^3 + 2x^4 + 4x^5 + \ldots$

$(1-x)A = 0 + 0x + 0x^2 + 2x^2 + 2x^4 + 2x^5 + \ldots$

WKT,

$$2x + 2x^2 + 2x^3 + \ldots = \frac{2x}{1-x}$$

or $$2x^3 + 2x^4 + 2x^5 + \ldots = \frac{2x}{1-x} - 2x - 2x^2$$

$$= \frac{2x^3}{(1-x)}$$

$\therefore$ Generating fn. $\Rightarrow$

$$(1-x)A = \frac{2x^3}{(1-x)}$$

$$A = \frac{2x^3}{(1-x)^2}$$

(4) $1, 5, 25, 125, \ldots$

Let $A = 1, 5, 25, 125, \ldots$

$A = 1 + 5x + 25x^2 + 125x^2 + \ldots$

$= 1 + 5.1x + 5.5x^2 + 5.25x^3 + \ldots$

Generating fn. for $1, 5, 25, 125, \ldots$

$$A = \frac{1}{1-5x}$$

Pg no. (4)