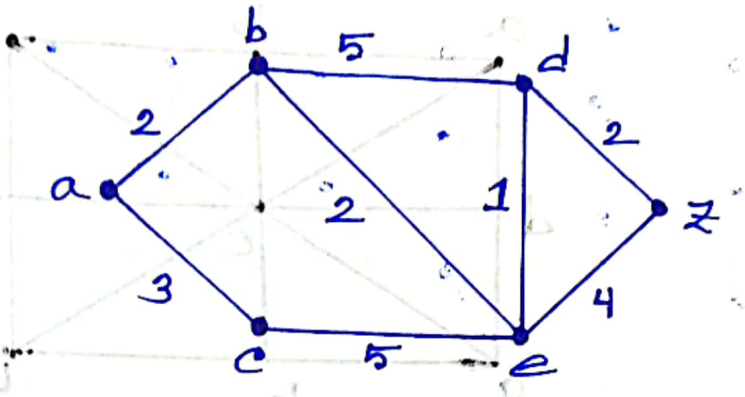
Exercise 8.6

#In exercise 2-4 find the length of a shortest path between a and z in the given weighted graph.

2.



Answer:- We will solve this problem by finding the length of a shortest path from a to successive vertices, until z is reached.

The only paths starting at a that contain no vertex other than a are a,b and a,c. Because the lengths of a,b and a,c are 2 and 3, respectively, it follows that b is the closest vertex to a. And the next closest vertex of b is b,d and b,e; here e is the closest one to b which contains 2.

And the closest vertex of e is e,d and e,z of 1 and 4 so, d is the closest one. After if d to closest vertex is z, contain 2.

So, the shortest path between a and z is, a,b,e,d,z which length is 7.

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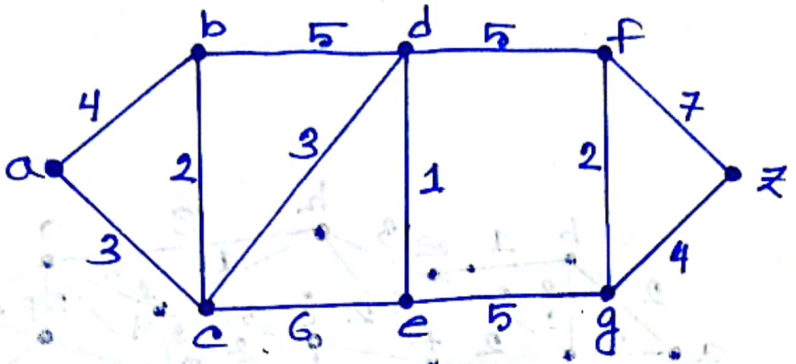
3.



Answer: We will solve this problem by finding the length of a shortest path from a to successive vertices until z is reached.

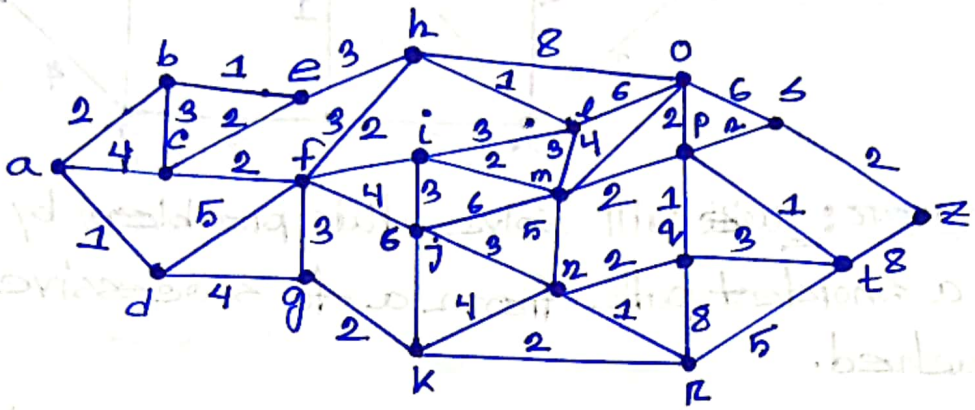
The shortest vertex which around or belong to only a is a,c and a,b with 3 and 4. So, c is the shortest one. Now, the next closest vertex to c, e, and a,d with 3 and 6; so, d is the closest one. Next vertex is d,e and d,f with 1 and 5; so, e is the closest one; Next vertex is e,g with 5; 5; so, e is the closest one; Next vertex is e,g with 5; Again, next vertex is g,f and g,z here f is closest to g but reaching z it will be biggest one so, g,z is the closest vertex with 4.

So, the shortest path between a to z is,

a, c, d, e, g, z.

And it's length is, 16.

4.



Answer: we will solve this problem by finding the length of a shortest path form a to successive vertices until z is reached.

The closest vertex belongs to a is a,b and a,d with 2, 1 in this case d will be closest but d to f will be biggest. So, a,b vertex is the closest one. Next closest one is b,e with 1. From e, the closest vertex is e,h with 3. Next colsest between h,l and h,o with 1 and 8; h,l is the closest one. From l, the closest vertex is l,m and l,o with 3, 6; so, l,m is the closest one. From, m; m,n; m,p and ~~m,o~~ with 5, 2, 2 and 4; m,p is the closest one. From p: p,t and p,s with 2,1 here, p,t will be closest but from t to z will be bigger one so, we can not take it; in this case p,s will be shortest with 2. and s to z is 2, the closest one.

So the shortest path is, a,b,e,h,l,m,p,s,z with length 16

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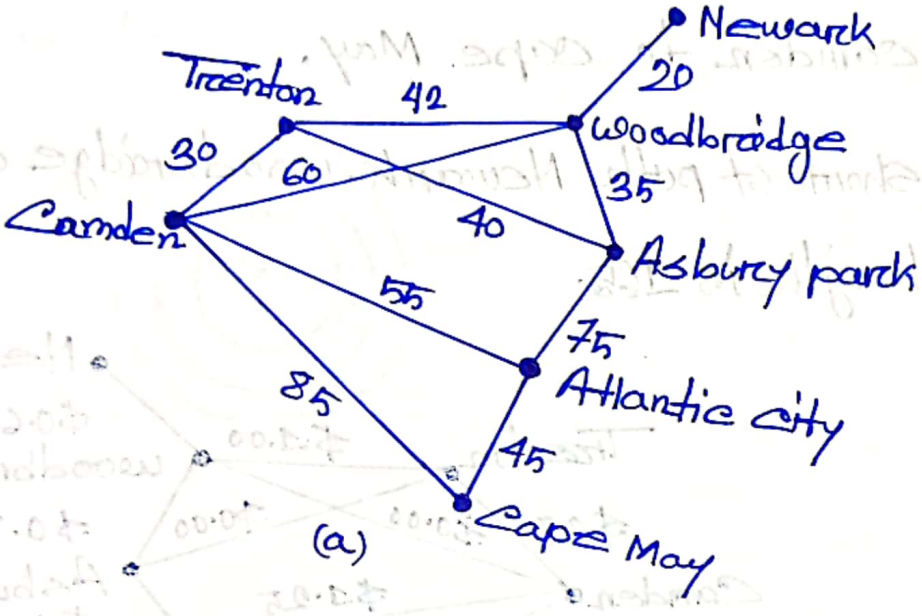
17. The weighted graphs in the figures here show some major roads in new jersey. Part(a) shows the distances between cities on these roads; Part (b) shows the tolls.



(a)

(a) Find a shortest route in distance between Newark and Cadmen, and between Newark and cape May; Using these roads.

Answer:- We can find the distance between Newark and camdemusing shortest path. From Newark the closest One city is Trenton and Woodbridge with 42 and 20; So, Woodbridge is the closest one. From Woodbridge to cadmen the shortest one lengh is 60.

the path is Newark, Woodbridge, camdem and the length is 80.

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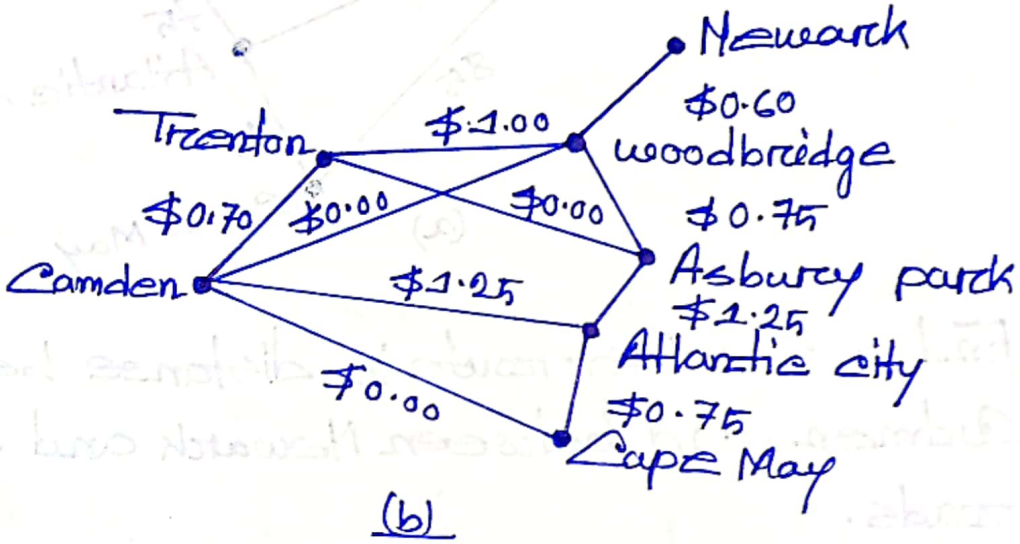
Again, From Newark to Cape May; the closest one is Newark to woodbridge and from woodbridge to camden and camden to cape May.

the shortest path Newark, woodbridge camden, cape May. and length is 165.



(b)

(b) Find a least ~~expensive~~ route in terms of total tolls Using the roads in the graph between the pairs of cities in part (a) of this exercise.

Answer: The total tolls between Newark and camden in a shortest path is the Newark, woodbridge, Camden. And the length is $0.60.

From, Newark to CapMay the shortest path is ~~Cam~~ Newark to woodbridge, Camden and cape May. The length is $0.60

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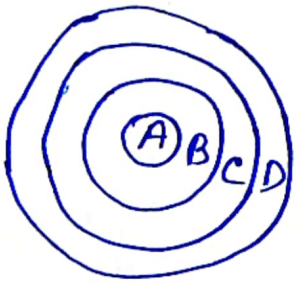
Exercise 8.8

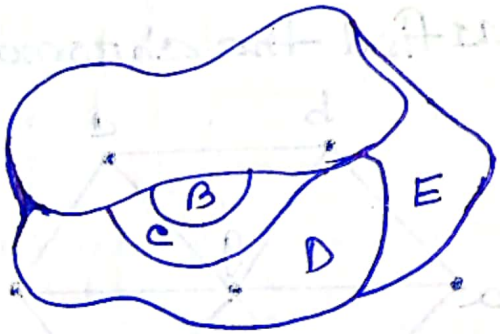
#In exercise 1-4 construct the dual graph for the map shown. Then find the number of colors needed to color the map so that no two adjacent regions have same color.

2.

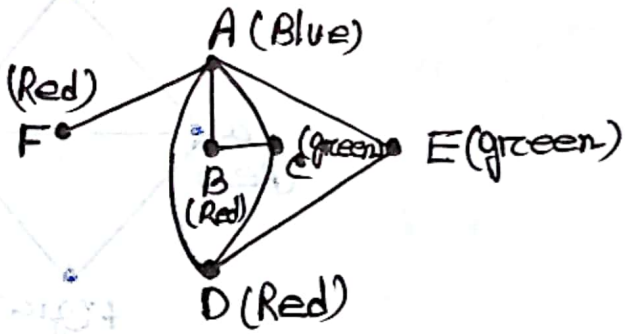


Answer:

3.



Answer: Three colors needed to color the map. Dual graph for the map shown below:



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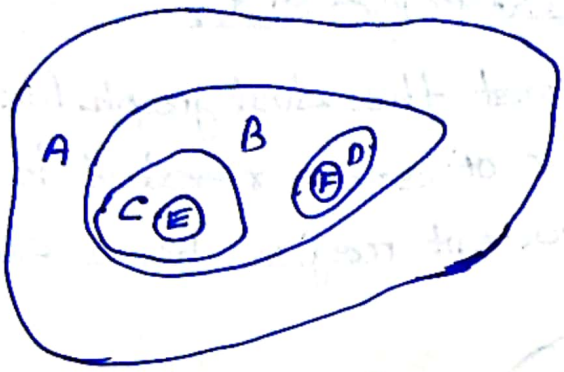
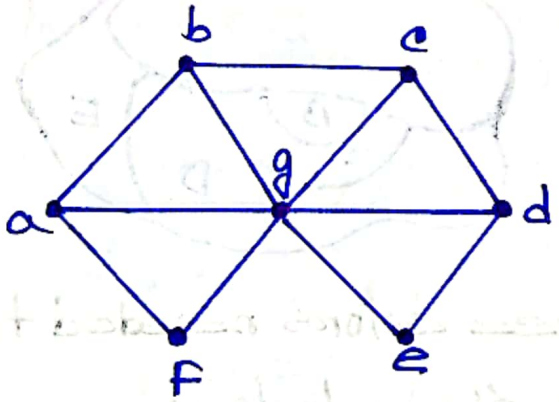
4.



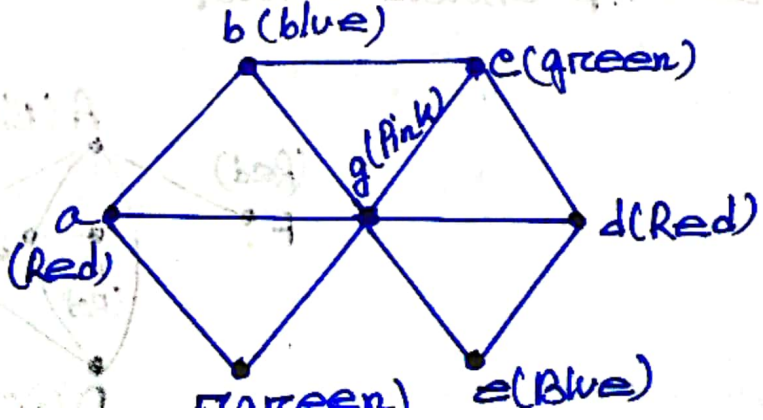
Answer:

#In exercise 5-11 find the chromatic number of the given graph.

6.



Answer:



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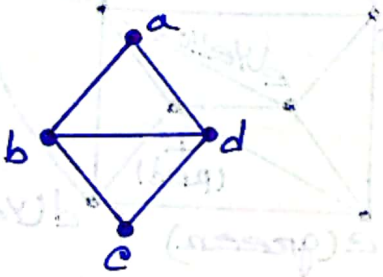
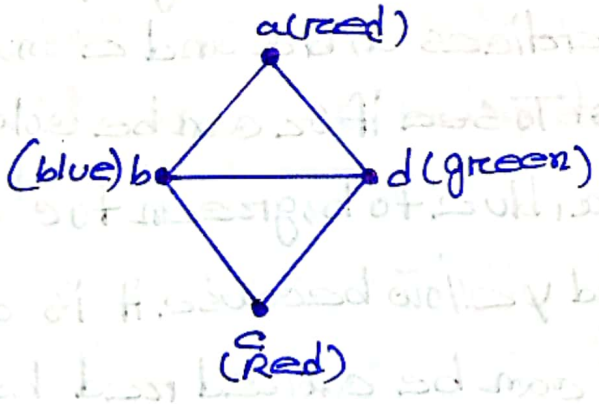
The chromatic number of the graph Gr is at least four, because the vertices a, b, f and g must be assigned different colors. To see if Gr can be colored with four colors, assign red to a, blue to b, green to f, pink to g. Then e can be colored green. Because it is adjacent to b and g. Futhermore, e can be colored blue because it is adjacent to d and g. d can be colored Red because it is adjacent to vertices colored balue and green. This produces a coloring of Gr using exactly four colors.

7.



Answer:



The chromatic number of Gr is at least three. Because the vertices a, b, d must be assigned different colors. To see if Gr can be colored with three colors, assign red to a, blue to b, and green to d. Then c can be colored red because it is adjacent to b and d. This produces a coloring of Gr using exacly 3 colors.

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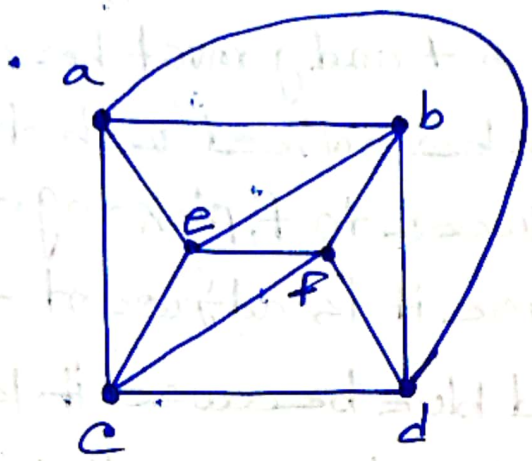
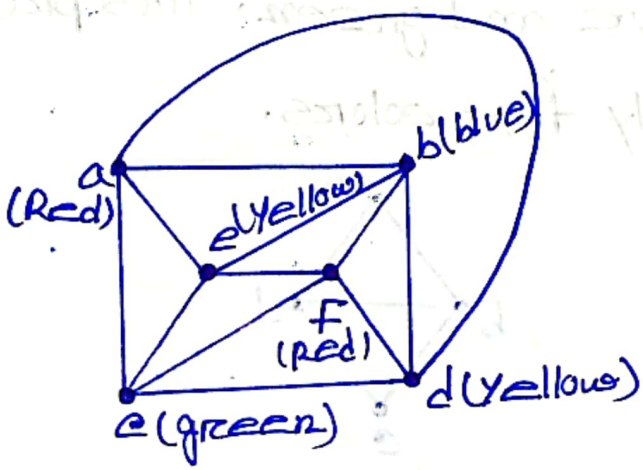
8.



Answer:



The chromatic number of the graph G_2 is at least four, because the vertices a, b c and e must be assigned different colors. To see if G_2 can be colored with four colour assigned red to a, blue to b, green to c and yellow to e. Then d can be colored yellow because it is adjacent to b, c, f furthermore, f can be colored red because it is adjacent only to vertices colored blue, green and yellow. This produces a coloring of G_2 using exactly four colors.

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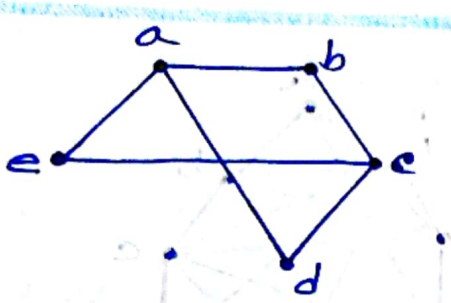
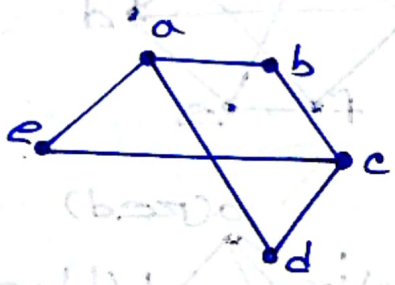
9.



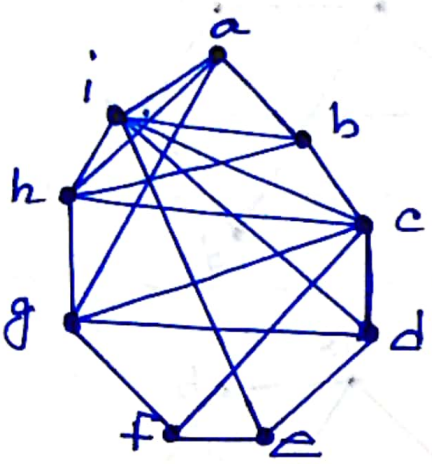
Answer :-



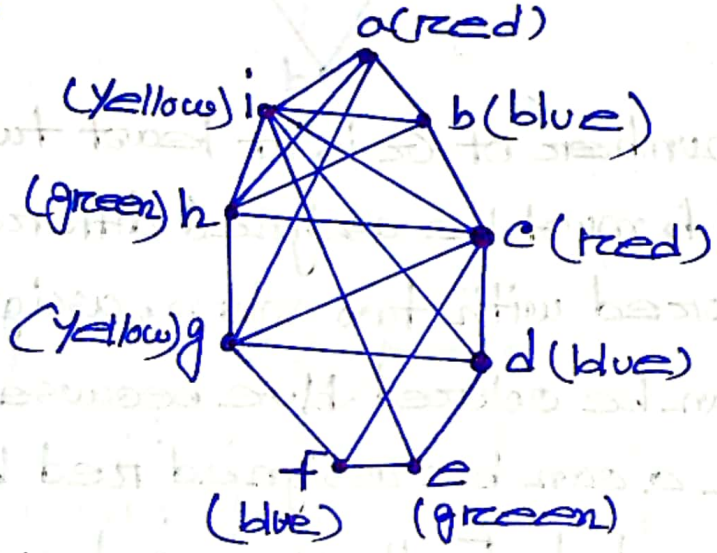
The chromatic number of G_2 is at least two, because the vertices a and b must be assigned different colors. To see if G_2 can be colored with two colors, assign red to a and blue to b. The e can be colored blue because it is adjacent to e and a. Then c can be assigned red because it is adja-cent to b, e and d. Furthermore d can be colored blue because it is adjacent only to vertices colored Red. This produces a coloring of G_2 using exactly two colors.

P.t.o

10.

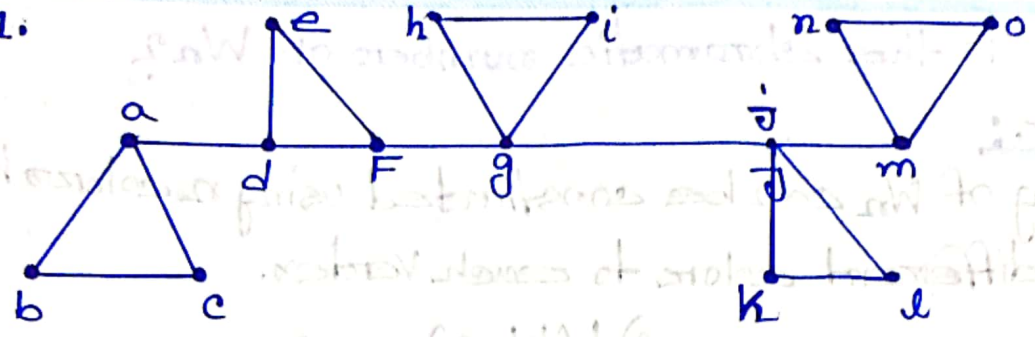


Answer:

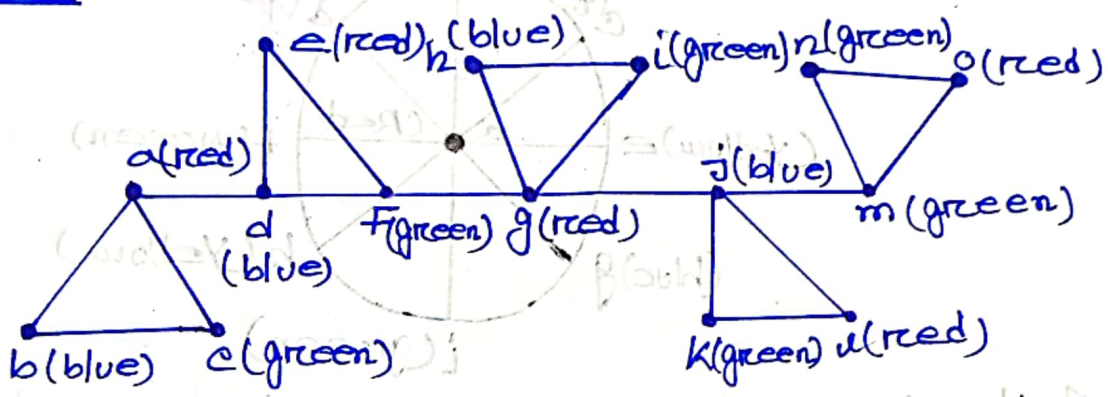


The chromatic number of G_2 is at least four because the vertices a, b, i and h must be assigned colors, To see if G_2 can be colored with four colors assign red to a, blue to b, i to yellow and green to h. Then c can be colored red because it is adjacent to i, h, g and f, d can be assigned blue because it is adjacent to e, i and g. Then e can be assigned green because it is adjacent to f and i. f can be assigned blue because it is adjacent to e, e, and g. Furthermores g can be assigned yellow because it is adjacent only to vertices colored green, red and blue. This produces a coloring of G_2 using exactly four colors.

11.



Answer:-



The chromatic number of G_2 is at least three because the vertices a, b and c must be assigned different colors. To see if G_2 can be assigned three colors assign red to a, blue to b and green to c. Then d can be assigned blue, because it is adjacent to a. Then e and f assigned red and green. Then g is assigned red because it is adjacent to f. Then h and i assigned blue and green. Then j is assigned blue because it is adjacent to g. Then k and l assigned green and red. Then m is assigned green because it is adjacent to j. Then n and o assigned green and red. This produces a coloring of G_2 using exactly three colors.

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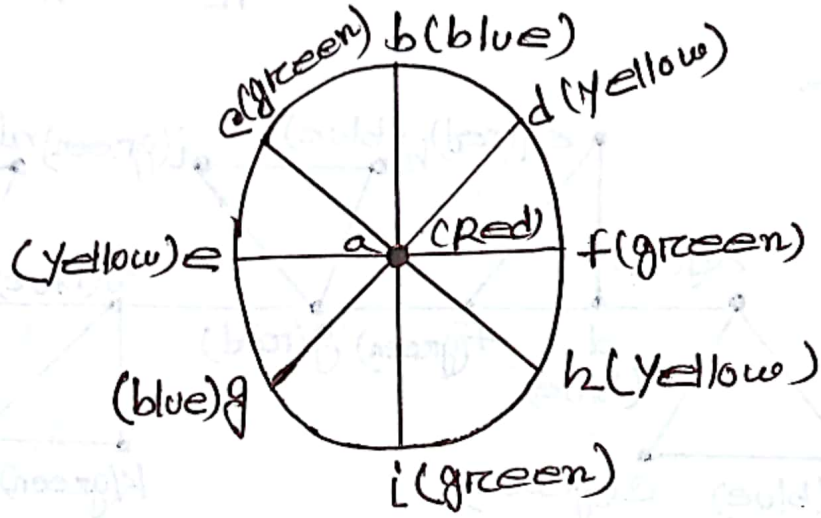
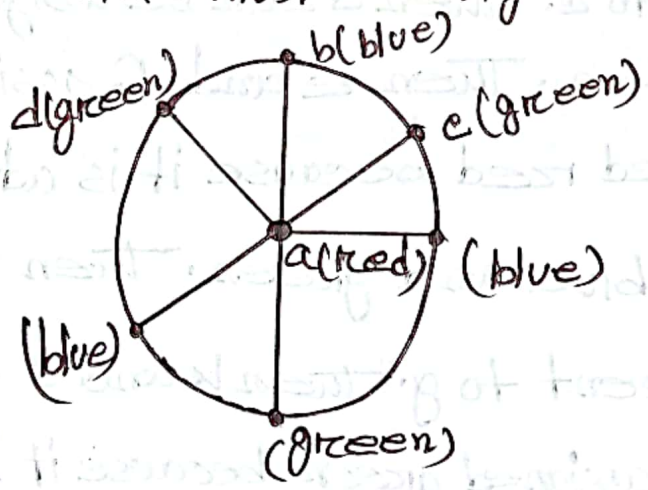
(15) What is the chromatic number of W_{n2}?

Answer:

A coloring of W_n can be constructed using n colors by assig-ning a different color to each vertex.



A wheel graph W_n $n \geq 4$ has chromatic number is 4 when n is even. A cyclic chromatic number of this graph also 4 and Star chromatic number is 4. Central Vertex assigned to red color. The vertices b, c, d must be assigned different colors.



A wheel graph W_n $n > 4$ has chromatic number is 3. When n is odd. A cyclic chromatic number of these graphs are same as result 1. Central Vertex assigned to red color. the Vertices

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b and a must be assigned ~~diffent~~ colores.

So, the chaomatic number of W_n is 3, if n is even; 4 if n is odd.