

15/10/19

Duration: - 2.30 hrs

F2150CG19

Maximum Marks : 75

- Note: - 1. All Questions are Compulsory.  
 2. Figures to the right indicate Marks.  
 3. Illustration in depth answers and diagrams will be appreciated.

**Q.1 Attempt all the questions (Each of 5 Marks)**

(15)

**A. Select the correct answers.**

- Pascal triangle is used to find the coefficient of \_\_\_\_\_ expansion.  
 a) multinomial    b) Binomial    c) exponential    d) None
- A vertex with degree one is called \_\_\_\_\_ vertex.  
 a) pendant    b) Isolated    c) Incident    d) None
- String is the \_\_\_\_\_ of character or symbol.  
 a) Series    b) sequence    c) line    d) Arrangement
- An edge (x,y) with flow  $\phi(x,y)$  and capacity (x,y) is said to be saturated when  
 $\phi(x,y)$  \_\_\_\_\_  $c(x,y)$   
 a)  $\neq$     b)  $\leq$     c)  $\geq$     d) =
- A Network is \_\_\_\_\_ Graph.  
 a) Discrete    b) Regular    c) Connected    d) Multigraph

**B. Fill in the blanks :-**

(1, least, 9, chromatic, combination)

- $n \cdot n^n =$
- Minimum numbers of colours required to colour the vertices of graph is called \_\_\_\_\_ number of graph.
- Every non-empty set of positive integers has a \_\_\_\_\_ Element.
- \_\_\_\_\_ is the selection of r objects from n objects.
- The value of  $R(3,4) =$  \_\_\_\_\_.

**C. Short Answers**

- Planner Graph
- Augmenting Tree
- Labelled Tree
- Complete Graph
- Binomial Theorem

**Q.2. Attempt the following (Any three)**

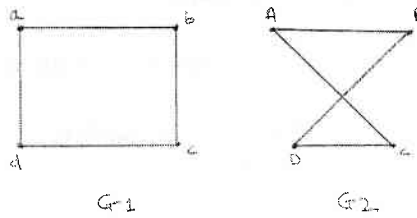
(15)

- For the binary string of length 10 how many of them  
 a) Begin with 1  
 b) Begin with 1 and ends with 0
- Determine the coefficient of  $xyz^2$  in the expansion of  $(x+y+z)^4$
- Prove that the sum of n natural number is  $\frac{n(n+1)}{2}$
- How many integer valued solution are there for the equation.  
 $x_1+x_2 + x_3 +x_4+x_5 = 132$  , all  $x_i \geq 0$
- for each  $n>0$ , prove that  
 $n_{c0} - n_{c1} + n_{c2} + \dots + (-1)^n n_{cn} = 0$
- How combinatorics is useful in graph theory.

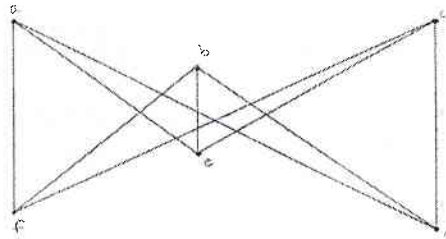
**Q.3 Attempt the following questions (Any Three)**

(15)

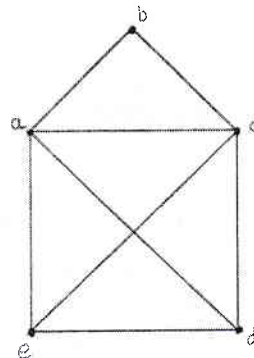
a. Show that following graphs are isomorphic.



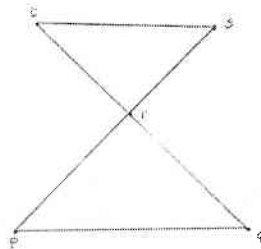
b. Verify Euler's formula for the given graph.



c. Define incident matrix and also find the incident matrix of the given graph.



d. Define Euler's path, Euler's circuit & Euler's graph also find an Eulerian circuit in the given graph.



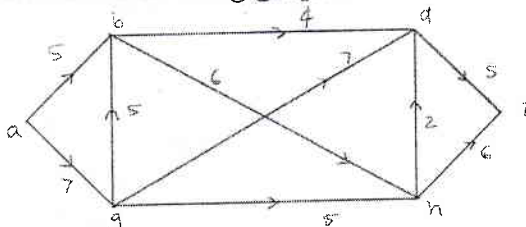
e. State & Explain Ramsey's theorem.

f. What is Bipartite graph? show that cycle of six vertices is bipartite graph.

**Q.4 Attempt the following questions (Any Three)**

(15)

a. Find the maximal flow of the following graph.



b. Explain relation between flow & cuts.

c. Explain complete matching with example.

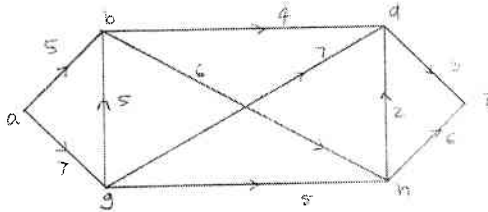
d. Write permutation shown below in cycle notation compute  $\pi_1 \pi_2$  & Inverse of  $\pi_1$

$$\pi_1 = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 3 & 1 & 5 & 8 & 2 & 6 & 4 & 7 \end{pmatrix}$$

$$\pi_2 = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 3 & 7 & 1 & 6 & 8 & 4 & 2 & 5 \end{pmatrix}$$

e. State Burnside's Theorem.

f. Define the capacity of cuts. find the capacity of the cut (P,Q) Where  $P = \{a, b, g\}$ ,  $Q = \{d, h, z\}$



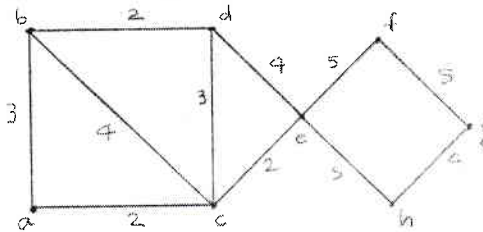
**Q.5. Attempt the following questions (Any Three)**

(15)

a. In how many ways can we arrange the letters of word MAHARASHTRA? How Many of these arrangement have vowels together?

b. Define chromatic numbers with examples.

c. Find minimum spanning tree using kruskal's algorithm.



d. Draw all regular graph on vertices with degree 2

e. What are the integer solution of linear programming.

Note : 1) All Questions are compulsory.  
2) Figures to right indicate marks.

**Q.1 Attempt All ( Each of 5 marks)**

**A) Multiple choice Questions.**

- i) \_\_\_\_\_ is an identifier which is used to store a value. (15)  
a) keyword      b) variable      c) operator      d) datatype (05)
- ii) The tag used to create a clientside image map  
a) <MAP>      b) USEMAP      c) <LINK>      d) None of these
- iii) In PHP language variables start with \_\_\_\_\_  
a) Var      b) \$ (DOLLAR)      c) ?      d) #
- iv) \_\_\_\_\_ metacharacter is used for white space character in regular expression.  
a) \s      b) \w      c) \d      d) \b
- v) jQuery is a \_\_\_\_\_  
a) JavaScript Library      b) JavaScript Language  
c) JavaScript method      d) PHP method.

**B) Fill in the blanks**

(<h1>, \_self, RegExp, <h6>, eXtensible Markup Language, clientside)

- i) XML stands for \_\_\_\_\_ (05)
- ii) Target attribute \_\_\_\_\_ is used to display response in same frame.
- iii) The \_\_\_\_\_ object is a regular expression object with predefined properties and methods.
- iv) JavaScript is often used for \_\_\_\_\_ validation.
- v) \_\_\_\_\_ is the tag that is used for smallest size heading.

**C. Write Answers in two lines.**

- i) What is difference between ordered list and unordered list. (05)
- ii) Explain href attribute in <a> tag.
- iii) What is the meaning of selectors in jQuery.
- iv) What is DTD in XML?
- v) List any four data types supported in JavaScript.

**Q.2. Answer the following (Any three)**

- a) What is Stylesheet? List its types. Explain one with an example. (15)
- b) How to insert Audio file on the webpage in HTML.
- c) Explain the following HTML 5 tags with an example.  
i) <img>      ii) <div>      iii) <span>      iv) <title>      v) <head>
- d) Write a note on CSS properties for positioning an element.
- e) Explain how to create table in HTML with example.
- f) Write an HTML code for the following :-

Name	Marks		Grade
	Theory	Practical	
A	70	78	A
B	50	60	B

**Q.3. Answer the following (Any three)**

- a) Explain JavaScript String object in detail. (15)
- b) Discuss how to define and invoke functions in JavaScript.
- c) Write a short note on Document Object Model (DOM)
- d) Write a JavaScript code for calculating factorial.
- e) What is XSLT? Explain how it works.
- f) Explain following elements w.r.t XSLT with example.