End Sem No. 2

Exam Year 2021

**Subject/ Code BCA/C4**

**F.M. = 75** **P.M.: 40 Including Mid Sem)** **Time=3Hrs.**

**General Instructions:**

i. **Group A carries very short answer type compulsory questions.**
ii. **Answer 4 out of 6 subjective/ descriptive questions given in Group B.**
(खंड 'B' के पाँच में से किन्हीं तीन विषयनिष्ठ/वर्णनात्मक प्रश्नों के उत्तर दें।)
iii. **Answer in your own words as far as practicable.**
(यथासंभव अपने शब्दों में उत्तर दें।)
iv. **Answer all sub parts of a question at one place.**
(एक प्रश्न के सभी भागों के उत्तर एक साथ लिखें।)
v. **Numbers in right indicate full marks of the question.**
(पूर्णांक दायीं ओर लिखे गये हैं।)

## Group A(Compulsory)

1. Write the answer in one sentence or in one word [10X1 =10]

(i)If A={a,b,c,d} . Then write the number of elements in power set A.

(ii) Define equivalence relation.

(iii) Find f(g(x) if $f(x)=x^2$ and $g(x)=x+1$.

(iv) What is order( big O value) of $f(x)=x^2+2x+1$?

(v)Arrange the function viz $x^2$ ,xlogx,x ,x! in ascending order of their growth.

(vi)If $a_n=3a_{n-1}$ and $a_0=2$ , Then find $a_3$.

(vii) Define degree of a vertex of graph.

(viii) Define isomorphic graph.

(ix)How many colors are required to color the vertex of fully connected graph of 4 vertex.

(x) Define tautologies.

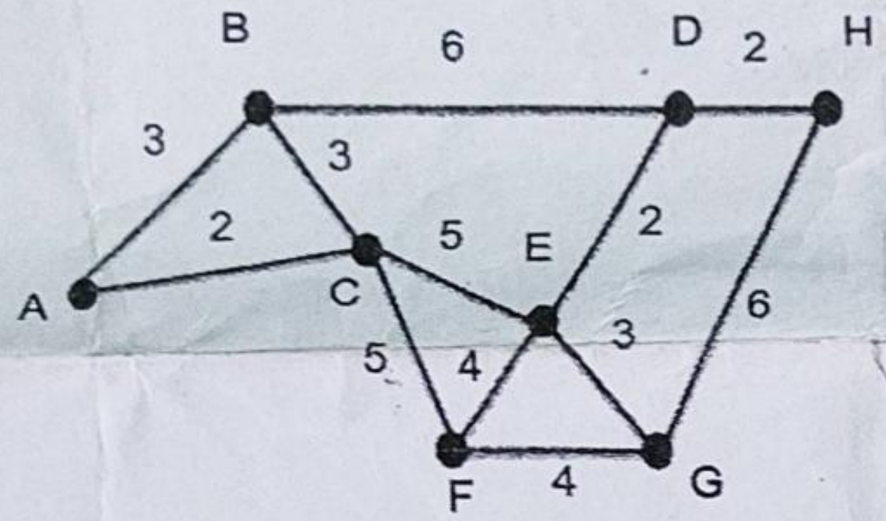
2. Using truth table prove that $(p \Rightarrow q) \Leftrightarrow (\sim q \Rightarrow \sim p)$ is tautology [5]

## Group-B(Answer Any 4)

3. (a)Explain union, intersection and set difference using example. [7 ½ ]
   (b)In a class of 100 students 50 students opt for volleyball and 60 students opt for basketball. 30 students opt for both. How many students do not play anything. [7 ½ ]

4. Let A={a,b,c,d,e} and R={(a,a), (a,b), (b,c), (c,e), (c,d), (d,e)} Compute (a) $R^2$ (b) $R^\infty$ [15]

5. What is recurrence relation? Explain how recurrence relation is converted into explicit formula using substitution method with the help of example. [15]
6. Explain the Kruskal algorithm to find minimum spanning. Find minimal spanning tree using the algorithm [15]




7. (a) Convert the sentence into predicate logic ."School is closed if more than 2 feet of snow falls or if the wind chill is below -100". [5]
   (b)Explain universal and existential quantifiers. [5]
   (c) Write short notes on asymptotic notations. [5]
8. Write short notes on
   (a) Equivalence Relation (b) Hamiltonian Cycle (c) Power Set [15]