Sem IV 2019-20 Internal

REENA METHA COLLEGE OFARTS,SCIENCE, COMMERCE & MANAGEMENT STUDIES

INTERNAL EXAMINATION 2019-2020

SEMESTER: IV

SUBJECT: Core Java **MARKS: 20**

DATE: 06 /02/2020 **TIME: 40 MINS**

Q1 Attempt any **four** questions.

1. Differentiate between C Language and Java.
2. Explain features of Java.
3. Explain any three types of Operators in Java with example.
4. Explain Static Block in Java with example.
5. Write a program to demonstrate Method Overloading concept.
6. Depict the Output of the following Code:

a)
```
public class Test
{
    public static void main(String args[]){
     int a=10, b=20;
     if(a<b){
            if(a>b)  System.out.println("Hello");
            else     System.out.println("Welcome"); } }
}
```

b)
```
public class Test
{
    public Test()   {
     System.out.print("1");
     new Test(10);
     System.out.print("5");
     }
    public Test(int temp){
     System.out.print("2");
     new Test(10,20);
     System.out.print("4");
     }
    public Test(int data, int temp){
     System.out.print("3");
     }
    public static void main(String args[]){
     Test t=new Test();
     }}
```

Sem IV 2019-20 Internal

REENA METHA COLLEGE OF COMMERCE & MANAGEMENT STUDIES

INTERNAL EXAMINATION 2019-2020

SEMESTER: IV

SUBJECT: Introduction to Embedded System **MARKS: 20**

DATE: 06/02/2020 **TIME: 45 MINS**

Q1 Attempt any **four** questions.

1. Explain working of washing machine in Embedded System.
2. Define Hybrid memory. Explain types of Hybrid memory.
3. Explain External Peripherals in details.
4. What is Embedded System and explain application of embedded system.
5. Explain the difference between RISC and CISC processor.
6. Explain the inner working of automotive embedded system.

Sem IV 2019-20 Internal

REENA METHA COLLEGE OF ARTS, SCIENCE COMMERCE & MANAGEMENT STUDIES

INTERNAL EXAMINATION 2019-2020

SEMESTER: IV

SUBJECT: Computer Graphics & Animation **MARKS: 20**

DATE: 08/02/2020 **TIME: 40 MINS**

Q1 Attempt any **four** questions.

1. Explain difference types of image and video input device in details.
2. Write a short note on Raster Refresh graphics display.
3. Write a short note on different types of video formats.
4. Explain the working of DDA line drawing algorithm.
5. Briefly explain Cohen-Sutherland line clipping algorithm.
6. Describe in brief the applications of computer graphics.

REENA METHA COLLEGE OF ARTS, SCIENCE, COMMERCE & MANAGEMENT STUDIES

INTERNAL EXAMINATION 2019-2020

SEMESTER: IV

SUBJECT: SOFTWARE ENGINEERING **MARKS: 20**

DATE: 07/02/2020 **TIME: 45 MINS**

Q1 Attempt any **four** questions.

1. What is extreme programming and FDD?
2. What is a RAD model?
3. What is Spiral Model?
4. What is SRS?
5. What is SDLC?
6. Explain the layered technology of software engineering. Explain the functional and non-functional requirements

(Time: 2½ hours)

Total Marks: 75

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: 15

a. What is the role of DBMS? What are its advantages over file system?
b. Explain storage system and query processor components of database structure.
c. What is a business rule? What is its purpose in data modeling?
d. Write comparison between hierarchical, network & relational model.
e. List and explain Codd's rules in detail.
f. Explain ER diagram and its components. Give the distinction between disjoint, overlapping, total and partial constraints. Draw E-R diagram for the following situations that correctly models this domain and its constraints.
A small racing league want a database to keep track of teams, drivers, races and scores in the league. The league is run for teams, which are identified by their names. Each team has one or more drivers signed up, and each driver is registered with the league and has a unique league licence number. First and last names of the drivers should also be included. A driver may only participate for a single team throughout the season. Races are identified simply by the dates when they are run. For each race, the league also wants to store the venue where it took place. Drivers participate in races, and for each participating driver the database should store the total race time for that driver, and the league score they got from that race.

2. Attempt *any three* of the following: 15

a. Why are entity integrity and referential integrity important in a database? Explain in detail.
b. Explain why normalization is necessary in database system & also explain database anomalies in detail.
You are given the following set of functional dependencies for a relation R(A,B,C,D,E,F),
F ={AB→C, DC →AE, E →F }
a. What are the keys of this relation?
b. Is this relation in BCNF? If not, explain why by showing one violation.
c. Is the decomposition (A, B, C, D) (B, C, D, E, F) a dependency preserving decomposition? If not, explain briefly.
c. Write short note on Cartesian product with its syntax and example.
d. Explain SET operators in relational algebra with example.
e. Explain formal definitions with safety of expressions of tuples relational calculus.
f. State the difference between relational algebra and calculus.

3. Attempt *any three* of the following: 15

a. What are constraints? What are the different types of constraints? Explain.
b. When can a view be updated? Explain the syntax of updating a view. Also state the difference between views and table.

[TURN OVER]

c Consider the relations :
Worker
(WORKER_ID,FIRST_NAME,LAST_NAME,SALARY,JOINING_DATE,DEPARTMENT)
Write the SQL queries for the following:

a. Write An SQL Query To Print The FIRST_NAME And LAST_NAME From Worker Table Into A Single Column COMPLETE_NAME. A Space Char Should Separate Them.
b. Write An SQL Query That Fetches The Unique Values Of DEPARTMENT From Worker Table And Prints Its Length.
c. Write An SQL Query To Print First Three Characters Of FIRST_NAME From Worker Table.
d. Write An SQL Query To Fetch Worker Names With Salaries >= 50000 And <= 100000.
e. Write An SQL Query To Fetch The No. Of Workers for Each Department in the Descending Order.

d Write in brief about SQL with its advantages and also explain NULL value concept. How NULL values are different from EMPTY values?

e Define Join and List its type and explain any two in details. Consider the following relation and solve the below query:
Sample table: departments
(DEPARTMENT_ID,DEPARTMENT_NAME ,MANAGER_ID , LOCATION_ID)
Sample table: employees
(EMPLOYEE_ID , FIRST_NAME , LAST_NAME , EMAIL , PHONE_NUMBER ,HIRE_DATE , JOB_ID , SALARY , COMMISSION_PCT , MANAGER_ID , DEPARTMENT_ID)

i) Write a query in SQL to display the first name, last name, department number, and department name for each employee.

f Differentiate between ANY and ALL operators with example & also explain hierarchical query.

4. Attempt *any three* of the following: **15**

a. List the ACID properties. Explain the usefulness of each.
b. Explain the concept of serializability and explain in detail view serializability.
c. What are concurrent transaction? Explain in detail the main features of concurrent execution.
d. What are the disadvantages of time stamping methods for concurrency control? Eplain timestamp ordering protocol.
e. What benefit does rigorous two-phase locking provide? How does it compare with other forms of two-phase locking?
f. If deadlock is avoided by deadlock-avoidance schemes, is starvation still possible? Explain your answer.

[PTO]

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5. **Attempt *any three* of the following:** **15**

a. What is the use of % TYPE attributes and how it is beneficial while declaring the variable?

b. Illustrate the attributes of implicit cursor with examples.

c. Explain the function Raise_Application_Error () with example.

d. List & explain the various features of PL/SQL & also differentiate between anonymous blocks and subprograms.

e. What are packages in PL/SQL? List and explain the various advantages of packages. Create a package to display the employee name and salary.

f. What are triggers? Explain the syntax for creating a trigger in PL/SQL. List the benefits of creating trigger in PL/SQL.

Q.P. Code: 33412

(2½ Hours)

[Total Marks: 75]

N. B.: (1) **All** questions are **compulsory**.
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(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labelled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: **15**

a. Water accounts for roughly 60% of total body weight. Assuming it can be categorized into six regions, the percentages go as follows. Plasma claims 4.5% of the body weight and is 7.5% of the total body water. Dense connective tissue and cartilage occupies 4.5% of the total body weight and 7.5% of the total body water. Interstitial lymph is 12% of the body weight, which is 20% of the total body water. Inaccessible bone water is roughly 7.5% of the total body water and 4.5% total body weight. If intracellular water is 33% of the total body weight and transcellular water is 2.5% of the total body water, what percent of total body weight must the transcellular water be and what percent of total body water must the intracellular water be?

b. What is a mathematical model? With the help of a flowchart, explain the of solving an engineering problem.

c. Discuss the aspects of round-off errors while storing floating point numbers in computer.

d. Use zero- through fourth-order Taylor series expansions to approximate the function:

$$f(x) = -0.1x^4 - 0.15x^3 - 0.5x^2 - 0.25x + 1.2$$

from $x_i = 0$ with $h = 1$. That is, predict the function's value at $x_{i+1} = 1$.

e. Explain Total numerical error, formulation error and data uncertainty.

f. Define accuracy and precision. What are round-off errors? Explain.

2. Attempt *any three* of the following: **15**

a. Determine the real root of $f(x) = -26 + 85x - 91x^2 + 44x^3 - 91x^2 + x^5$ between 0.5 and 1.0 correct up to 3 decimal places using bisection method.

b. Determine the positive real root of $\ln(x^4) = 0.7$ between 0.5 and 2 using method of false position.

c. Solve: $x - 0.8 - 0.2sinx = 0$ using Newton Raphson method correct upto 4 decimal places starting with initial value 0.

d. From the table of Bessel function $J_n(1)$, estimate the value of $J_{\frac{3}{2}}(1)$

n	-1	$-\frac{3}{4}$	$-\frac{1}{2}$	$-\frac{1}{4}$	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1
$J_n(1)$	–0.4401	0.0447	0.4311	0.6694	0.7652	0.7522	0.6714	0.5587	0.4401

e. Find $f(8.4)$ if $f(8.1) = 16.94410$, $f(8.3) = 17.56492$, $f(8.6) = 18.50515$, $f(8.7) = 18.82091$ using Lagrange's Interpolation formula.

f. Using the necessary interpolation formula find $f(1)$ and $f(1.5)$ from the table:

x	–1	0	2	3
$f(x)$	–8	3	1	12

[TURN OVER]

3. Attempt *any three* of the following: **15**

a. Solve the following system by using the Gauss-Jordan elimination method.

$$x + y + z = 5$$
$$2x + 3y + 5z = 8$$
$$4x + 5z = 2$$

b. Use the Gauss-Seidel iterative technique to find approximate solutions to

$$a + b + 2c = 1$$
$$2a - b + d = -2$$
$$a - b - c - 2d = 4$$
$$2a - b + 2c - d = 0$$

c. Given log 280 = 2.4472, log 281 = 2.4487, log 283 = 2.4518, log 286 = 2.4564. Find $\left[\frac{d}{dx}(logx)\right]_{x=280}$

d. Evaluate the following using Simpson's 3/8th rule.

$$\int_0^{\pi} \frac{sin^2\theta}{5 + 4cos\theta} d\theta$$

e. Use Euler's method to approximate the solution for

$$y' = t^{-2}(sin2t - 2ty), \quad 1 \le t \le 2, y(1) = 2 \text{ with } h = 0.5$$

f. Solve $y' = y - t^2 + 1$, $y(0) = 0.5$, $0 \le t \le 2$ using Runge Kutta 4th order method with $h = 0.5$

4. Attempt *any three* of the following: **15**

a. Fit a second order polynomial to the data given below:

x	0	1	2	3	4	5
y	2.1	7.7	13.6	27.2	40.9	61.1

b. Fit a straight line to the given data regarding x as the independent variable.

x	1	2	3	4	5	6
y	1200	900	600	200	110	50

c. Consider the data below:

x	1	2	3	4
y	1	7	11	21

Use linear least-squares regression to determine a function of the form $y = be^{mx}$ for the given data by specifying b and m.

d. A farmer can plant up to 8 acres of land with wheat and barley. He can earn ₹ 5,000 for every acre he plants with wheat and ₹ 3,000 for every acre he plants with barley. His use of a necessary pesticide is limited by federal regulations to 10 gallons for his entire 8 acres. Wheat requires 2 gallons of pesticide for every acre planted and barley requires just 1 gallon per acre. What is the maximum profit he can make? Solve graphically.

e. The Bead Store sells material for customers to make their own jewelry. Customer can select beads from various bins. Grace wants to design her own Halloween necklace from orange and black beads. She wants to make a necklace that is at least 12 inches long, but no more than 24 inches long. Grace also wants her necklace to contain black beads that are at least twice the length of orange beads. Finally, she wants her necklace to have at least 5 inches of black beads.
Find the constraints, sketch the problem and find the vertices (intersection points).

[TURN OVER]

f. A garden shop wishes to prepare a supply of special fertilizer at a minimal cost by mixing two fertilizers, A and B.
The mixture is to contain: at least 45 units of phosphate, at least 36 units of nitrate at least 40 units of ammonium. Fertilizer A costs the shop \$.97 per pound. Fertilizer B costs the shop \$1.89 per pound. Fertilizer A contains 5 units of phosphate and 2 units of nitrate and 2 units of ammonium, fertilizer B contains 3 units of phosphate and 3 units of nitrate and 5 units of ammonium. How many pounds of each fertilizer should the shop use in order to minimize their cost?

5. Attempt *any three* of the following: **15**

a. The amount of bread (in hundreds of pounds) X that a certain bakery is able to sell in a day is found to be a numerical valued random phenomenon, with a probability function specified by the probability density function $f(x)$, given by

$$f(x) = A \cdot x \quad \text{for } 0 \le x \le 5$$
$$= A(10 - x) \quad \text{for } 5 \le x \le 10$$
$$= 0, \text{ otherwise}$$

i. Find the value of A such thatf(x) is a probability density function.

ii. What is the probability that the number of pounds of bread that will be sold tomorrow is
- more than 500 pounds
- less than 500 pounds
- between 250 and 750 pounds?

b. Suppose the life in hours of a certain kind of radio tube has the probability density function:

$$f(x) = \frac{100}{x^2}, \text{when } x \ge 100$$
$$= 0, \text{when } x < 100$$

What is the probability that none of three such tubes in a given radio set will have to be replaced during the first 150 hours of operation? What is the probability that all three of the original tubes will have been replaced during the first 150 hours?

c. The diameter of an electric cable; say X, is assumed to be a continuous random variable with p.d.f.

$$f(x) = 6x(1 - x), \quad 0 \le x \le 1.$$

i. Check that the function is p.d.f.

ii. Determine a number b such that $P(X < b) = P(X > b)$

d. If 20% of the bolts produced by a machine are defective, determine the probability that, out of 4 bolts chosen at random, (i) 1, (ii) 0, and (iii) at most 2 bolts will be defective.

e. A department in a works has 10 machines which may need adjustment from time to time during the day. Three of these machines are old, each having a probability of 1/11 of needing adjustment during the day, and 7 are new having corresponding probabilities of 1/21. Assuming that no machine needs adjustment twice on the same day, determine the probability that on a particular day

i. just 2 old and no new machines need adjustment.

ii. If just 2 machines need adjustment, they are of the same type.

f. In a book of 520 pages, 390 typo-graphical errors occur. Assuming Poisson law for the number of errors per page, find the probability that a random sample of 5 pages will contain no error.

Sem IV

Q. P. Code: 36155

(2½ hours)

Total Marks: 75

N. B.: (1) **All** questions are **compulsory**.
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(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: **15**

a. Explain Software Development Life Cycle (SDLC) with the help of diagram.
b. What is software? Explain the characteristics of software.
c. Define software engineering and its layer with the help of diagram.
d. Write a short note on spiral model.
e. What are functional and non-functional requirements of software?
f. Explain the principles of agile methods and discuss the problems with agile methods.

2. Attempt *any three* of the following: **15**

a. Describe the different stages of system engineering process.
b. Explain the essential characteristics of socio technical system.
c. Define and explain the two types of emergent properties.
d. Explain the process or the steps of requirement engineering briefly.
e. Explain context diagram and its components of data flow diagram (DFD) with the help of example.
f. Explain legacy system categories and its assessment with the help of example.

3. Attempt *any three* of the following: **15**

a. Define architectural design and explain the functions of architectural design.
b. Explain user interface design process (UID).
c. Explain software project management briefly.
d. Briefly explain the various stages performed in the process of risk management.
e. Explain the functions of quality assurance and its standards.
f. Describe why it is important to measure the software metrics.

4. Attempt *any three* of the following: **15**

a. Explain the two phases of system testing: integration and release testing.
b. Explain briefly verification and validation (V & V) process.
c. List and describe the static analysis check points involved in automated static analysis.
d. Write a short note on size oriented metrics of software measurement.
e. Explain type of metrics function points and object point to estimate the software productivity
f. Describe three different models of Constructive Cost Models (COCOMO).

[TURN OVER]

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5. **Attempt *any three* of the following:** **15**

a. Explain various stages of process improvement with the help of diagram.

b. Explain the different levels of **CMMI** (Capability Maturity Model introduced) Framework.

c. Briefly describe the concept of **SOA** (Service Oriented Architecture) and the benefits of SOA.

d. What are the benefit and problem of reusing software?

e. Define distributed software engineering and explain the issues of distributed system.

f. Write a short note on SaaS (Software as a Service).

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Sem IV

Q.P. Code: 36157

(Time: 2½ hours)

Total Marks: 75

N. B.: (1) **All** questions are **compulsory**.
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(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: **15**

a. Write a note on:
   i) Autoboxing and unboxing
   ii) Java Development Kit(JDK).

b. List and explain the components of Java Virtual Machine(JVM).

c. Java is called as platform independent and strongly typed language. Justify your answer.

d. Write a Java code to
   i) check whether the string "madam" is starting and ending with a same letter.
   ii) countall vowels in a string "welcome".
   iii) replace 'w' with 'W' in a string "welcome".
   iv) append "Welcome" and "MADAM"

e. What do you mean by object reference variable in Java? Differentiate between object and reference of a class.

f. Predict the output of the following code:

```
I)class PassArrArg
{
  public static void main(String [] args)
  {
    PassArrArg p = new PassArrArg();
    p.start();
  }
 void start()
  {
    long [] a1 = {3,4,5};
    long [] a2 = fix(a1);
   System.out.print(a1[0] + a1[1] + a1[2] + " ");
   System.out.println(a2[0] + a2[1] + a2[2]);
  }
  long [] fix(long [] a3)
  {
    a3[1] = 7;
    return a3;
  }
}
```

[TURN OVER]

II)class Test

```
{
  public static void main(String [] args)
  {
     int x= 0;
     int y= 0;
    for (int z = 0; z < 5; z++)
    {
      if (( ++x > 2 ) && (++y > 2))
      {
        x++;
      }
    }
   System.out.println(x + " " + y);
  }
}
```

2. Attempt *any three* of the following: **15**

a. Explain how memory is allocated to objects in Java?
b. Discuss in detail the working of 'foreach' loop in Java.
c. Explain the need of variable arguments with help of an example.
d. What is garbage collection in Java? How it is helpful?
e. When do we use keywords final and static? Explain the working of static member functions.
f. What do you mean by method overloading? Write a program to implement the concept of constructor overloading.

3. Attempt *any three* of the following: **15**

a. Explain the use of keywords super and this. What are the facts based on which base class constructors will be called while creating derived class objects?
b. What is an interface? How is an interface different from a class?
c. Explain the concept of method overriding with the help of an example.
d. What is the purpose of a package? Explain the steps to create user define packages in Java.
e. Write a program to implement the concept of multilevel inheritance.
f. Define an abstract class 'Shape' with an abstract method namely 'CircleArea' taking one parameter that is its radius to compute area of a circle. Now create another class 'Area' containing a method 'CircleArea' for printing the area of circle. Create an object of class 'Area' and test class 'Area'.

4. Attempt *any three* of the following: **15**

a. Why do we need to use vectors? Explain with the help of an example.
b. Explain life cycle of thread with a neat labeled diagram.
c. Can we handle multiple exceptions using a single catch block? Justify your answer with an example.
d. Write a program to demonstrate the use of a class FileInputStream. Accept the input file name at command line.

[TURN OVER]

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e. What do you mean by streams? Explain the concept of streams and types of streams available in Java.

f. Write a program that creates two threads. Each thread is instantiated from the same class. It executes a loop with 10 iterations. Each iteration displays "Welcome" message, sleeps for 200 milliseconds.

5. Attempt *any three* of the following: **15**

a. What is the use of adapter class in Java? Explain any one of the adapter classes defined in Java.

b. What is the role of layout manager? What is the default layout of frame? Explain its working.

c. How the concept of inner classes helps in Java to handle events? Explain with the help of interface MouseListener.

d. Develop a frame that has three radio buttons Red, Green, Blue. On Click of any one of them background color of the frame should change accordingly.

e. Explain any two overloaded constructors and three methods of class Scrollbar.

f. Write a program to demonstrate the use of Canvas.

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(2½ hours)

[Total Marks: 75]

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(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: **15**

a. List and explain the different asymptotic notations used in data structures.
b. What are the different ways in which data structures are classified? Explain in detail.
c. What do you mean by complexity of an algorithm? Explain its types.
d. Write an algorithm for binary search in an array.
e. What is sparse matrix? Explain different types of sparse matrix.
f. Explain with the help of an example how to merge two sorted arrays.

2. Attempt *any three* of the following: **15**

a. Explain the structure and types of linked list.
b. Write the algorithm for insertion of a node at the given position and deletion at the end in linked list.
c. Write an algorithm to copy one linked list into another linked list.
d. Write an algorithm to insert an element at the beginning and end of circular linked list.
e. Write and explain an algorithm for inserting at the beginning in two way linked list.
f. Explain the different categories of header linked list.

3. Attempt *any three* of the following: **15**

a. Write the algorithm for push and pop operation of the stack.
b. Write the algorithm for converting infix to postfix and convert the following expression to postfix notation using stack.
I=(6+2)*5-8/4
c. Write the algorithm for evaluating a postfix expression using stack and give an example.
d. How insertion and deletion operations take place in a queue?
e. Explain how queue can be represented using linked list and give the algorithm for insertion in it.
f. How priority queues are represented in memory.

4. Attempt *any three* of the following: **15**

a. Write an algorithm to find the minimum and maximum element in binary search tree.
b. Create a heap for the given elements 15 7 10 2 20 15 18.
c. Construct a binary tree from its inorder and postorder traversals.
In-order: 5 10 12 15 18 20 25 30 35 40 50
Post-order: 5 12 18 15 10 25 35 50 40 30 20
d. Sort the following elements using selection sort.
22 35 17 8 13 44 5 28

[TURN OVER]

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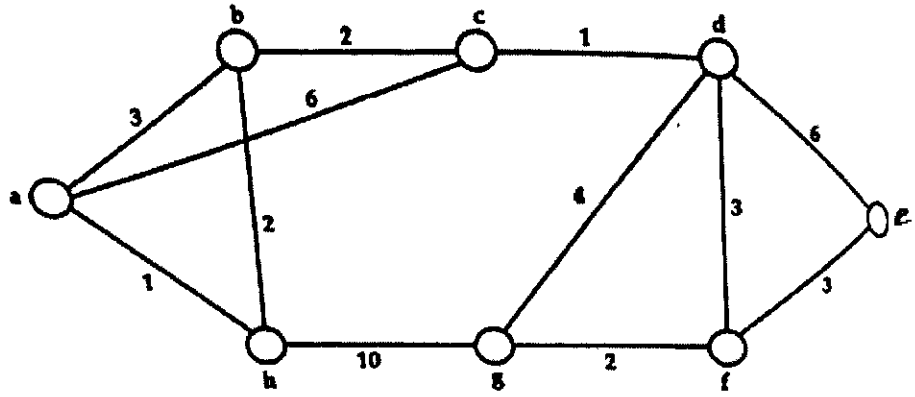
e. Write and explain the algorithm for finding a position of a given element and its parent in a binary search tree.
f. Write the algorithm for inserting in a node in Red-Black tree.

5. Attempt *any three* of the following: **15**

a. What are the different ways to represent graphs in memory? Explain.
b. Write and explain the algorithm for best first search in a graph.
c. Using Prim's algorithm find the minimum spanning tree.



d. Define the following terms.
   1. Graph.
   2. Weighted graph.
   3. Multi graph.
   4. Directed graph.
   5. Hamiltonian path.

e. Explain any two collision resolution techniques.
f. What are hash table and hash functions? Explain folding method and mid square method for constructing hash functions.

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