Assignment no 4

(1) What is the role of the static keyword in the context of memory management?

- Static variables & methods are belongs to the class not instances.
- Static variables & methods are stored in the method area of memory
- Static variables are shared across all instances of a class, saving memory by avoiding duplication.
- Static variables are allocated once for the class
- Static methods & variables can be accessed without creating an istance of the class.
- Static variable & methods are sharing common data among instaces. it reduce memory consumption.

Q.2 Can static methods be overloaded and overridden in Java? How static variables shared across multiple instances of a class?

(1) Static methods can be overloaded.
(2) Static methods cannot be overridden.
- Static methods are belong to the class not instances.
(3) (5) - Static variables are stored at the class level, not in individual instances

- only one copy of a static variable is created and it is shared among all

instances of the class.

- Static all references are stored in the same variable in method area.

Q.3 What is the significance of final keyword in Java.

→ ① Final keywords restrict the variable, method, & classes.

② It's applies restriction.

③ Final variable
- final variables value cannot be changed
- must be initialized either during declaration or in the constructor.

④ Final method:-
- A final method cannot be overridden by subclasses
- Ensures the method's implementation remains unchanged in derived classes.

⑤ Final class
- It can not be extends means no subclass can inherit it
- It is used to prevent inheritance and ensure the class's behaviour is not altered.

Q.4 What are narrowing & widening conversion in Java.

→ ① widening
Converting smaller data to a larger data type automatically is called widening.

- int to long
  float to double

- In widening their is no data loss

② narrowing-
- Converting larger datatype into smaller datatype.

- double to float
  long to int.

- Data loss can be possible.

Q.5. provide the examples of narrowing and widening conversions between primitive data types?

→ ① narrowing

① double d1 = 123.25;
  float f1 = ~~double~~ (float) d1;

② long l1 = 123456;
  int I1 = (int) l1;

widening

① float f1 = 23.45;
double d1 = f1;

② int I1 = 234;
long L1 = I1;

Q.6 How does Java handle potential loss of of precision during narrowing conversion?

→ In Java in narrowing handle data loss

① compile-time-error
→ gives the compile-time error to prevent data loss

② Explicit typecasting
- It is mandatory in narrowing to Explicit typecasting for data loss
long f1 = 234.5;
int I1 = (int) f1;

③ Loss of precision
- when we convert from float to int the data loss is occured of decimal points

④ Rounding issue:-
- less precision in decimal point

Q7 Explain the concept of automatic widening conversion in Java.

→ widening conversion occurs when smaller data type is converted into larger data types.

- not resulting in data loss
- Implicit conversion occur
- follow Heirarchical order
- byte → short → int → long → float → double
- char - int → long - float - double.

Q8 What are the implications of narrowing & widening conversions on type compatability & data loss?

→ ① widening conversion is done by Automatic type conversion

- It an Implicit type casting
- no data loss in widening.

② narrowing
- It is done by Explicit type casting
- It not Atomic type conversion
- data loss may be occurs.