Abstract Classes

1. **What is an abstract class?**
   An abstract class is a class which may or may not contain abstract methods.

2. **What is an abstract method?**
   An abstract method is a method which does not have a body or implementation.

3. **Is it compulsory for the abstract class to include abstract methods?**
   No. An abstract class may contain completely concrete methods as well.

4. **Can abstract class be instantiated?**
   No. Abstract class is normally incomplete. Hence, it cannot be instantiated.

5. **Can abstract class be subclassed?**
   Yes.
   (Refer Shape example in class notes)

6. **Is it compulsory for the subclass of an abstract class to provide all the method implementations?**
   No.

7. **If the subclass of an abstract class do not provide all the method implementations then what must be done?**
   Such a subclass must be declared as an abstract class.

8. **When should you consider using abstract classes in your project?**
   In the class hierarchy, if at a given level, the method body cannot be provided, then in such cases, the method must be declared as abstract.

9. **What is a Concrete class?**

Concrete class is a class which contains concrete methods i,e all the methods would be having implementation or body.

10. Can we declare abstract class as final?

No. Illegal combination of modifiers error would occur.

11. Can an abstract class have a super class which is abstract?

Yes.

12. Can an abstract class have a super class which is concrete?

Yes.

13. Can an abstract class have a sub class which is abstract?

Yes.

14. Can an abstract class have a sub class which is concrete?

Yes.

15. Can a concrete class have a super class which is abstract?

Yes.

16. Can a concrete class have a super class which is concrete?

Yes.

17. Can a concrete class have a sub class which is abstract?

Yes.

18. Can a concrete class have a sub class which is concrete?

Yes.

19. Can we have a final abstract method? Why?

No. Illegal combination of modifiers error would occur.

20. Do abstract methods have method definition?

No.

21. Do abstract methods have method declaration?

Yes.

22. Can an abstract class completely contain concrete methods?

Yes.

23. Can a concrete class completely contain abstract methods?

No.

24. Can an abstract class contain main() method?

Yes.

25. When should we declare a method as abstract?

In the class hierarchy, if at a given level, the method body cannot be provided, then in such cases, the method must be declared as abstract.

26. **What is the difference between pure abstract class and impure abstract class?**

A pure abstract class is a class which contains only abstract methods. It would not contain any concrete method.

Impure abstract class is a class which could contain a few concrete methods along with abstract methods.

27. What is the advantage of abstract classes?

Polymorphism can be achieved.

28. Can you create an object of an abstract class? Why?

No, because abstract class is incomplete. An object of an incomplete class can not be created.

29. Can an abstract class be defined without any abstract methods?

Yes.

30. What role does an abstract class enforce?

Abstraction.

31. Can we have an abstract variable?

No. Only abstract method is permitted.

32. Can an abstract class have static variables?

Yes

33. Can an abstract class have static methods?

Yes.

34. Can we have constructor within the abstract class?

Yes.

35. Which design pattern do abstract classes promote?

template method design pattern