Question 11

Answer: Let blue = 3x, red = 7x. When 20 blue balls are added: (3x + 20)/7x = 1/2 6x + 40 = 7x x = 40. So red = 7x = 280.

Question 12

Answer: Depends on the code snippet (not provided).

Question 13

Answer: Use binary logic. $2^{10} = 1024 > 1000$. So minimum 10 test subjects are enough.

Question 14

Answer: A sprint is a time-boxed development cycle in Agile to deliver incremental functionality.

Question 15

Answer: A static method belongs to the class, not instances, and can be called without an object.

Question 16

Answer: Immutable objects enhance safety, thread-safety, and predictability in OOP.

Question 17

Answer: Use Kruskals or Prims algorithm to find the MST.

Question 18

Answer: Depends on the code snippet (not provided).

Question 19

Answer: O(log n) in a balanced BST.

Question 20

Answer: Count number of divisors of 72. Divisors: 1,2,3,4,6,8,9,12,18,24,36,72 Total = 12 people flipped it.

Question 21 & 22

Answer: Capacity = 5, current = 3 Can insert 2 more elements.

Question 23

Answer: Use two-pointer method: move one pointer n steps ahead, then move both till the first hits end.

Question 24

Answer: Traverse BST: if u and v < root, go left; if > root, go right; else root is LCA.

Question 25

Answer: 36 (since it's 6^2 next is $7^2 = 49$).

Question 26

Answer: Use a junction/bridge table with foreign keys referencing both tables.

Question 27

Answer: Cannot determine without seeing the code.

Question 28

Answer: FLOATING is not a valid SQL data type.

Question 29

Answer: False: DP solves problems with overlapping *subproblems*, not unique ones.

Question 30

Answer: False: RDBMS does not support hierarchical data model natively.

Question 31

Answer: 1-hour gap = 60 km. Relative speed = 30 km/h. Time to catch = 2 hrs 10:00 AM.

Question 32

Answer: Polymorphism (specifically, runtime polymorphism via method overriding).

Question 33

Answer: this refers to the current object of the class.

Question 34

Answer: Agile model emphasizes iterative development and continuous feedback.

Question 35

Answer: Undo functionality (LIFO structure use stack).

Question 36

Answer: Use Union-Find (Disjoint Set Union) to count connected components.

Question 37

Answer: Iteration allows continuous feedback and regular improvements in Agile.

Question 38

Answer: BFS finds the shortest path in an unweighted graph. Exact answer depends on the graph.

Question 39

Answer: Method overloading is an example of compile-time polymorphism.

Question 40

Answer: O(1) using mathematical sum difference approach.

Question 41

Answer: Depends on code, but likely an example of type casting (upcasting/downcasting).

Question 42

Answer: Depends on the structure. A graph with an odd cycle is not bipartite.

Question 43

Answer: final prevents method overriding, variable reassignment, or class inheritance.

Question 44

Answer: SELECT name FROM customers c JOIN orders o ON c.id = o.customer_id GROUP BY c.name HAVING SUM(o.total) > 1000;

Question 45

Answer: Incorrect: Primary key can be NULL (This is false, primary keys cannot be NULL).