



**PUNE VIDYARTHI GRIHA'S**  
**COLLEGE OF SCIENCE AND TECHNOLOGY**  
Affiliated to University of Mumbai

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## Question Bank

**Class: F.Y.B. Sc.CS**

**Semester: I**

**Subject: Discrete Mathematics**

1. If A and A are complementary events, then  $P(A) = \dots\dots\dots$ 
  - a.  $1+P(A)$
  - b.  $1-P(A)$
  - c.  $P(A)$
  - d.  $-P(A)$
  
2. If A and B are independent events then, conditional probability  $P(A/B) = \dots\dots\dots$ 
  - a.  $P(A)-P(B)$
  - b.  $P(A)$
  - c.  $P(B)$
  - d.  $P(A)+P(B)$
  
3. If A and B are independent events then,  $P(AB) = \dots\dots\dots$ 
  - a.  $P(A)$
  - b.  $P(B)$

c.  $P(A) + P(B)$

d.  $P(A) P(B)$

4. Probability can be .....

a. Greater than or equal to 10

b. Greater than 1

c. Less than 0

d. Between 0 and 1

5. When two dice are tossed, probability of getting six as uppermost face on both the dice is

a.  $\frac{1}{2}$

b.  $\frac{1}{6}$

c.  $\frac{1}{36}$

d.  $\frac{1}{3}$

6. Which one of the following can be probability ratio ?

a.  $\frac{3}{2}$

b.  $\frac{17}{11}$

c.  $\frac{2}{3}$

d.  $-\frac{1}{2}$

7. If from a pack of 52 well shuffled cards a card is drawn, the chances of getting a queen is .....

a.  $\frac{1}{4}$

- b.  $1/52$
- c.  $1/3$
- d.  $1/13$

8. A box contains 2 red marble balls, 3 white marble balls, 5 green marble balls. If 2 balls are drawn at random, the chances of getting both white is .....

- a.  $2/3$
- b.  $3/10$
- c.  $2/10$
- d.  $3/45$

9. All possible outcomes of a statistical experiments are called .....

- a. Cyber space
- b. Sample space
- c. Space
- d. Experiment

10. An occurrence of an outcome to any statistical experiment is called .....

- a. Sample space
- b. Experiment
- c. Event
- d. Probability

11. A statistical experiment means .....

- a. Action which has reaction

- b. Action which has a certain outcome
- c. Action which has no outcome
- d. Action which has uncertain outcome

12. Two events are said to be mutually exclusive when .....

- a. Both of them occur together
- b. None of them occur
- c. Occurrence is uncertain
- d. Only one them occurs

13. For a statistical experiment every possible outcome is called .....

- a. Sample
- b. Sample point
- c. Space
- d. Population

14. Two events are said to be exhaustive when .....

- a. Both of them occur together
- b. Occurrence of one avoids occurrence of other
- c. Occurrence or non-occurrence of one affect occurrence of other event
- d. Taken together constitute sample space

15. Two events are said to be independent if .....

- a. Occurrence of one prevents occurrence of other

- b. Occurrence or non-occurrence of one does not affect occurrence of other
- c. Both of them always occurs together
- d. Only one of them can occur at a time

16. Complementary events are .....

- a. Not mutually exclusive
- b. Independent
- c. Exhaustive
- d. Impossible event

17. Complementary events are .....

- a. Mutually exclusive
- b. Independent
- c. Exhaustive
- d. Impossible event

18. If  $P(A)$  denotes probability of event A then .....

- a.  $0 \leq P(A) \leq 1$  is true
- b.  $1 \leq P(A) \leq 0$  is true
- c.  $-1 \leq P(A) \leq 0$  is true
- d.  $0 \leq P(A) \leq 1$  is true

19. An unbiased coin is tossed twice, if A denotes the event all tails then  $P(A)$  .....

- a.  $\frac{1}{4}$

- b.  $\frac{1}{2}$
- c.  $\frac{3}{4}$
- d. 1

20. If A and B are any two events associated with an experiment, then probability of occurrence of events A or B or both A and B is given by .....

- a. Complementary probability theorem
- b. Multiplication theorem of probability
- c. Addition theorem of probability
- d. Joint probability theorem

21. If A and B are any two events associated with an experiment, then probability of occurrence of both A and B simultaneously is given by .....

- a. Complementary probability theorem
- b. Multiplication theorem of probability
- c. Addition theorem of probability
- d. Bayes theorem of probability

22. If A and B are any two events associated with an experiment, the probability of occurrence of event A or B or both A and B is expressed as .....

- a.  $A \cap B$
- b.  $A \cup B$
- c.  $A - B$
- d.  $A + B$

23. If A and B are any two events associated with an experiment, the probability of occurrence of both A and B simultaneously is expressed as .....

- a.  $A \cap B$
- b.  $A \cup B$
- c)  $A - B$
- d)  $A * B$

24. If A and B are any two events associated with an experiment, then probability of occurrence of only A is expressed as .....

- a.  $A \cup B$
- b.  $A \cap B'$
- c.  $A - B$
- d)  $A * B$

25. For variable x can assume values 10 or 50 with probabilities  $\frac{3}{4}$  and  $\frac{1}{4}$  respectively then expected value of variable is .....

- a. 30
- b. 20
- c. 40
- d. 10

26. A bag contains 3 copper coins and 7 silver coins. If a coin is drawn, then the chance to get a silver coin is .....

- a.  $\frac{7}{3}$
- b.  $\frac{3}{7}$
- c.  $\frac{7}{10}$
- d.  $\frac{3}{10}$

27. A variable  $x$  capable of taking values  $x_1, x_2, x_3, \dots, x_n$  with respective probabilities  $p_1, p_2, p_3, \dots, p_n$  then it is called .....

- a. Continuous random
- b. Continuous
- c. Discrete random
- d. Discrete

28. If a variable  $x$  assumes values  $x_1, x_2, x_3, \dots, x_n$  with respective probabilities  $p_1, p_2, p_3, \dots, p_n$  then it is called probability distribution provided .....

- a.  $P_i \geq 0$  and sum of  $(P_i) < 1$
- b.  $0 \leq P_i \leq 1$  and sum of  $(P_i) > 1$
- c.  $P_i \geq 1$  and sum of  $(P_i) = 1$
- d.  $0 \leq P_i \leq 1$  and sum of  $(P_i) = 1$

29. A bag contains 4 coins of Rs.5 , 6 coins of Rs.2 , a coin is drawn at random, the expected gain is .....

- a. 3.5
- b. 5
- c. 8.5
- d. 3.2

30. How many friends must you have to guarantee so that at least 5 of them will have their birthdays in the same month?

- a. 47

- b. 48
- c. 49
- d. 50

31. How many minimum people are required to guarantee, then at least two of them are born exactly at the same time?

- a) 86401
- b) 86402
- c) 86403
- d) 86404

32. How many numbers must be selected from the set  $\{1, 2, 3, 4, 5, 6\}$  to guarantee that at least one pair of these numbers add up to 7?

- a) 3
- b) 4
- c) 5
- d) 2

33. There are 38 different time periods during which classes at a university can be scheduled. If there are 677 different classes, how many different rooms will be needed?

- a) 16
- b) 17
- c) 18
- d) 19

34. In a class of 50 students, how many minimum number of students are there who were born in the same month?

- a) 2
- b) 3

c) 4

d) 5

35. Suppose a computer installation has 4 I/O units (A, B, C and D) and 3 CPU's (X, Y and Z). Any I/O unit can be paired with any CPU. How many ways are there to pair an I/O unit with CPU?

a) 11

b) 12

c) 13

d) 14

36. A typical PIN is a sequence of any 4 symbols chosen from 26 letters in the alphabet and 10 digits. How many different PIN's are possible?

a) 1679614

b) 1679615

c) 1679616

d) 1679617

37. Three newspapers A, B and C are published in a city and a survey of readers indicates the following : 20% read A, 16% read B, 14% read C, 8% read A and B, 5% read A and C, 4% read B and C and 2% read all the 3. For a person chosen at random, find the probability that he reads at least one of the papers.

a) 35%

b) 65%

c) 75%

d) 25%

38. Given  $P(B) = 1/6$ ,  $P(AB) = 1/6$ . Find  $P(A/B)$

- a)  $\frac{1}{3}$
- b)  $\frac{2}{3}$
- c)  $\frac{1}{6}$
- d)  $\frac{1}{4}$

39. Find the expected number of heads that can be obtained in a throw of 2 coins.

- a) 0
- b) 1
- c) 2
- d) 5

40. The probability that A hits a target is  $\frac{1}{3}$  and the probability that B hits the target is  $\frac{2}{5}$ . What is the probability that target will be hit if A and B shoot at the target?

- a)  $\frac{3}{5}$
- b)  $\frac{1}{3}$
- c)  $\frac{2}{5}$
- d)  $\frac{2}{15}$

41. The flag of a newly formed forum is in the form of three blocks, each to be colored differently. If there are six different colors to from, how many such designs ax possible?

- a) 120
- b) 100
- c) 150
- d) 170

42. Six students have taken an examination. In how many ways can first three positions be declared?

- a) 120

b) 100

c) 150

d) 170

43. How many different signals, each consisting of six flags hung in a vertical line can be formed four identical red flags and two identical blue flags?

a) 10

b) 15

c) 20

d) 17

44. There are 12 points in a plane, no three of which are collinear. Find a) How many straight lines can be drawn? b) How many triangles can be drawn?

a) 15 and 67

b) 20 and 40

c) 25 and 30

d) 66 and 220

45. At an election there are 5 candidates and 3 members are to be elected and a voter is entitled to vote for any number to be elected but not more than members to be elected. In how many ways a voter can cast his vote?

a) 15

b) 20

c) 25

d) 30

46. What is the Cartesian product of  $A = \{1, 2\}$  and  $B = \{a, b\}$ ?

a)  $\{(1, a), (1, b), (2, a), (b, b)\}$

b)  $\{(1, 1), (2, 2), (a, a), (b, b)\}$

c)  $\{(1, a), (2, a), (1, b), (2, b)\}$

d)  $\{(1, 1), (a, a), (2, a), (1, b)\}$

47. What is the cardinality of the set of odd positive integers less than 10?

- a) 10
- b) 5
- c) 3
- d) 20

48. Which of the following two sets are equal?

- a)  $A = \{1, 2\}$  and  $B = \{1\}$
- b)  $A = \{1, 2\}$  and  $B = \{1, 2, 3\}$
- c)  $A = \{1, 2, 3\}$  and  $B = \{2, 1, 3\}$
- d)  $A = \{1, 2, 4\}$  and  $B = \{1, 2, 3\}$

49. The set of positive integers is \_\_\_\_\_

- a) Infinite
- b) Finite
- c) Subset
- d) Empty

50. What is the Cardinality of the Power set of the set  $\{0, 1, 2\}$ ?

- a) 8
- b) 6
- c) 7
- d) 9

51. The members of the set  $S = \{x \mid x \text{ is the square of an integer and } x < 100\}$  is

- a)  $\{0, 2, 4, 5, 9, 58, 49, 56, 99, 12\}$
- b)  $\{0, 1, 4, 9, 16, 25, 36, 49, 64, 81\}$
- c)  $\{1, 4, 9, 16, 25, 36, 64, 81, 85, 99\}$
- d)  $\{0, 1, 4, 9, 16, 25, 36, 49, 64, 121\}$

52.  $\{x: x \text{ is an integer neither positive nor negative}\}$  is \_\_\_\_\_

- a) Empty set
- b) Non-empty set
- c) Finite set
- d) Non- empty and Finite set

53. Write set  $\{1, 5, 15, 25, \dots\}$  in set-builder form.

- a)  $\{x: \text{either } x=1 \text{ or } x=5n, \text{ where } n \text{ is a real number}\}$
- b)  $\{x: \text{either } x=1 \text{ or } x=5n, \text{ where } n \text{ is a integer}\}$
- c)  $\{x: \text{either } x=1 \text{ or } x=5n, \text{ where } n \text{ is an odd natural number}\}$
- d)  $\{x: x=5n, \text{ where } n \text{ is a natural number}\}$

54. The union of the sets  $\{1, 2, 5\}$  and  $\{1, 2, 6\}$  is the set \_\_\_\_\_

- a)  $\{1, 2, 6, 1\}$
- b)  $\{1, 2, 5, 6\}$
- c)  $\{1, 2, 1, 2\}$
- d)  $\{1, 5, 6, 3\}$

55. The intersection of the sets  $\{1, 2, 5\}$  and  $\{1, 2, 6\}$  is the set \_\_\_\_\_  
a)  $\{1, 2\}$   
b)  $\{5, 6\}$   
c)  $\{2, 5\}$   
d)  $\{1, 6\}$

56. Two sets are called disjoint if there \_\_\_\_\_ is the empty set.  
a) Union  
b) Difference  
c) Intersection  
d) Complement

57. Which of the following two sets are disjoint?  
a)  $\{1, 3, 5\}$  and  $\{1, 3, 6\}$   
b)  $\{1, 2, 3\}$  and  $\{1, 2, 3\}$   
c)  $\{1, 3, 5\}$  and  $\{2, 3, 4\}$   
d)  $\{1, 3, 5\}$  and  $\{2, 4, 6\}$

58. The difference of  $\{1, 2, 3\}$  and  $\{1, 2, 5\}$  is the set \_\_\_\_\_  
a)  $\{1\}$   
b)  $\{5\}$   
c)  $\{3\}$   
d)  $\{2\}$

59. The complement of the set A is \_\_\_\_\_  
a)  $A - B$   
b)  $U - A$   
c)  $A - U$   
d)  $B - A$

60. The set difference of the set A with null set is \_\_\_\_\_  
a) A  
b) null  
c) U  
d) B

61. If  $n(A)=20$  and  $n(B)=30$  and  $n(A \cup B) = 40$  then  $n(A \cap B)$  is?  
a) 20  
b) 30  
c) 40  
d) 10

62. In the given figure the if  $n(A)=20, n(U)=50, n(C)=10$  and  $n(A \cap B)=5$  then  $n(B)=?$   
a) 20  
b) 35  
c) 40  
d) 10

63. Consider the recurrence relation  $a_1=4, a_n=5n+a_{n-1}$ . The value of  $a_{64}$  is \_\_\_\_\_  
a) 10399  
b) 23760

- c) 75100
- d) 53700

64. Determine the solution of the recurrence relation  $F_n = 20F_{n-1} - 25F_{n-2}$  where  $F_0 = 4$  and  $F_1 = 14$ .

- a)  $a_n = 14 \cdot 5^{n-1}$
- b)  $a_n = 7/2 \cdot 2^n - 1/2 \cdot 6^n$
- c)  $a_n = 7/2 \cdot 2^n - 3/4 \cdot 6^{n+1}$
- d)  $a_n = 3 \cdot 2^n - 1/2 \cdot 3^n$

65. What is the recurrence relation for 1, 7, 31, 127, 499?

- a)  $b_{n+1} = 5b_{n-1} + 3$
- b)  $b_n = 4b_n + 7!$
- c)  $b_n = 4b_{n-1} + 3$
- d)  $b_n = b_{n-1} + 1$

66. If  $S_n = 4S_{n-1} + 12n$ , where  $S_0 = 6$  and  $S_1 = 7$ , find the solution for the recurrence relation.

- a)  $a_n = 7(2^n) - 29/6n6^n$
- b)  $a_n = 6(6^n) + 6/7n6^n$
- c)  $a_n = 6(3^{n+1}) - 5n$
- d)  $a_n = nn - 2/6n6^n$

67. Find the value of  $a_4$  for the recurrence relation  $a_n = 2a_{n-1} + 3$ , with  $a_0 = 6$ .

- a) 320
- b) 221
- c) 141
- d) 65

68. The solution to the recurrence relation  $a_n = a_{n-1} + 2n$ , with initial term  $a_0 = 2$  are \_\_\_\_\_

- a)  $4n + 7$
- b)  $2(1 + n)$
- c)  $3n^2$
- d)  $5 \cdot (n+1)/2$

69. Determine the solution for the recurrence relation  $a_n = 6a_{n-1} - 8a_{n-2}$  provided initial conditions  $a_0 = 3$  and  $a_1 = 5$ .

- a)  $a_n = 4 \cdot 2^n - 3^n$
- b)  $a_n = 3 \cdot 7^n - 5 \cdot 3^n$
- c)  $a_n = 5 \cdot 7^n$
- d)  $a_n = 3! \cdot 5^n$

70. A function is said to be \_\_\_\_\_ if and only if  $f(a) = f(b)$  implies that  $a = b$  for all  $a$  and  $b$  in the domain of  $f$ .

- a) One-to-many
- b) One-to-one
- c) Many-to-many
- d) Many-to-one

71. Which of the following function  $f: Z \times Z \rightarrow Z$  is not onto?

- a)  $f(a, b) = a + b$
- b)  $f(a, b) = a$
- c)  $f(a, b) = |b|$
- d)  $f(a, b) = a - b$

72. Let  $f$  and  $g$  be the function from the set of integers to itself, defined by  $f(x) = 2x + 1$  and  $g(x) = 3x + 4$ . Then the composition of  $f$  and  $g$  is \_\_\_\_\_

- a)  $6x + 9$
- b)  $6x + 7$
- c)  $6x + 6$
- d)  $6x + 8$

73. The inverse of function  $f(x) = x^3 + 2$  is \_\_\_\_\_

- a)  $f^{-1}(y) = (y - 2)^{1/2}$
- b)  $f^{-1}(y) = (y - 2)^{1/3}$
- c)  $f^{-1}(y) = (y)^{1/3}$
- d)  $f^{-1}(y) = (y - 2)$

74. The  $g^{-1}(\{0\})$  for the function  $g(x) = [x]$  is \_\_\_\_\_

- a)  $\{x \mid 0 \leq x < 1\}$
- b)  $\{x \mid 0 < x \leq 1\}$
- c)  $\{x \mid 0 < x < 1\}$
- d)  $\{x \mid 0 \leq x \leq 1\}$

75. What is the domain of a function?

- a) the maximal set of numbers for which a function is defined
- b) the maximal set of numbers which a function can take values
- c) it is a set of natural numbers for which a function is defined
- d) none of the mentioned

76. What is domain of function  $f(x) = x^{1/2}$ ?

- a)  $(2, \infty)$
- b)  $(-\infty, 1)$
- c)  $[0, \infty)$
- d) None of the mentioned

77. What is the range of a function?

- a) the maximal set of numbers for which a function is defined
- b) the maximal set of numbers which a function can take values
- c) it is set of natural numbers for which a function is defined
- d) none of the mentioned

78. An injection is a function which is?

- a) many-one
- b) one-one
- c) onto
- d) none of the mentioned

79. A mapping  $f : X \rightarrow Y$  is one one if \_\_\_\_\_

- a)  $f(x_1) \neq f(x_2)$  for all  $x_1, x_2$  in  $X$
- b) If  $f(x_1) = f(x_2)$  then  $x_1 = x_2$  for all  $x_1, x_2$  in  $X$
- c)  $f(x_1) = f(x_2)$  for all  $x_1, x_2$  in  $X$
- d) None of the mentioned

80. If  $f(x) = y$  then  $f^{-1}(y)$  is equal to \_\_\_\_\_

- a)  $y$
- b)  $x$
- c)  $x^2$
- d) none of the mentioned

81. A function  $f(x)$  is defined from  $A$  to  $B$  then  $f^{-1}$  is defined \_\_\_\_\_

- a) from  $A$  to  $B$
- b) from  $B$  to  $A$
- c) depends on the inverse of function
- d) none of the mentioned

82. If  $f$  is a function defined from  $\mathbb{R}$  to  $\mathbb{R}$ , is given by  $f(x) = 3x - 5$  then  $f^{-1}(x)$  is given by

- \_\_\_\_\_
- a)  $1/(3x-5)$
  - b)  $(x+5)/3$
  - c) does not exist since it is not a bijection
  - d) none of the mentioned

83. The graph representing universal relation is called \_\_\_\_\_

- a) complete digraph
- b) partial digraph
- c) empty graph
- d) partial subgraph

84. What is a complete digraph?

- a) connection of nodes without containing any cycle
- b) connecting nodes to make at least three complete cycles
- c) start node and end node in a graph are same having a cycle
- d) connection of every node with every other node including itself in a digraph

85. Disconnected components can be created in case of \_\_\_\_\_

- a) undirected graphs
- b) partial subgraphs
- c) disconnected graphs
- d) complete graphs

86. A simple graph can have \_\_\_\_\_

- a) multiple edges
- b) self loops
- c) parallel edges
- d) no multiple edges, self-loops and parallel edges

87. Degree of a graph with 12 vertices is \_\_\_\_\_

- a) 25
- b) 56
- c) 24
- d) 212

88. In a finite graph the number of vertices of odd degree is always \_\_\_\_\_

- a) even
- b) odd
- c) even or odd
- d) infinite

89. An undirected graph has 8 vertices labelled 1, 2, ..., 8 and 31 edges. Vertices 1, 3, 5, 7 have degree 8 and vertices 2, 4, 6, 8 have degree 7. What is the degree of vertex 8?

- a) 15
- b) 8
- c) 5
- d) 23

90. Which of the following relation is a partial order as well as an equivalence relation?

- a) equal to(=)
- b) less than(<)
- c) greater than(>)
- d) not equal to(!=)

91. The relation  $\leq$  is a partial order if it is \_\_\_\_\_

- a) reflexive, antisymmetric and transitive
- b) reflexive, symmetric
- c) asymmetric, transitive
- d) irreflexive and transitive

92. The \_\_\_\_\_ of a graph G consists of all vertices and edges of G.

- a) edge graph
- b) line graph
- c) path complement graph
- d) eulerian circuit

93. A \_\_\_\_\_ in a graph G is a circuit which consists of every vertex (except first/last vertex) of G exactly once.

- a) Euler path
- b) Hamiltonian path
- c) Planar graph
- d) Path complement graph

94. A walk has Closed property if \_\_\_\_\_

- a)  $v_0 = v_k$
- b)  $v_0 > v_k$
- c)  $v < 0$
- d)  $v_k > 1$

95. A trail in a graph can be described as \_\_\_\_\_

- a) a walk without repeated edges
- b) a cycle with repeated edges
- c) a walk with repeated edges
- d) a line graph with one or more vertices

96. If a graph  $G$  is  $k$ -colorable and  $k < n$ , for any integer  $n$  then it is \_\_\_\_\_

- a)  $n$ -colorable
- b)  $n^2$  nodes
- c)  $(k+n)$ -colorable
- d)  $(k^3+n^3+1)$  nodes

97. For a connected planar simple graph  $G=(V, E)$  with  $e=|E|=16$  and  $v=|V|=9$ , then find the number of regions that are created when drawing a planar representation of the graph?

- a) 321
- b) 9
- c) 1024
- d) 596

98. A non-planar graph can have \_\_\_\_\_

- a) complete graph
- b) subgraph
- c) line graph
- d) bar graph

99. Which of the following is the set of  $m \times m$  invertible matrices?

- a) a permutation group of degree  $m^2$
- b) a general linear group of degree  $m$
- c) a sublattice group of degree  $m$
- d) a isomorphic graph of  $m$  nodes

100. There exists \_\_\_\_\_ between group homology and group cohomology of a finite group.

- a) homomorphism
- b) isomorphism
- c) automorphism
- d) semilattice structure

101. An undirected graph  $G$  which is connected and acyclic is called \_\_\_\_\_

- a) bipartite graph
- b) cyclic graph
- c) tree
- d) forest

102. An  $n$ -vertex graph has \_\_\_\_\_ edges.

- a)  $n^2$
- b)  $n-1$
- c)  $n*n$
- d)  $n*(n+1)/2$

103. The tree elements are called \_\_\_\_\_

- a) vertices
- b) nodes
- c) points
- d) edges

104. In an n-ary tree, each vertex has at most \_\_\_\_\_ children.

- a) n
- b)  $n^4$
- c)  $n*n$
- d)  $n-1$

105. Two labeled trees are isomorphic if \_\_\_\_\_

- a) graphs of the two trees are isomorphic
- b) the two trees have same label
- c) graphs of the two trees are isomorphic and the two trees have the same label
- d) graphs of the two trees are cyclic

106. A graph which consists of disjoint union of trees is called \_\_\_\_\_

- a) bipartite graph
- b) forest
- c) caterpillar tree
- d) labeled tree

107. If two cycle graphs  $G_m$  and  $G_n$  are joined together with a vertex, the number of spanning trees in the new graph is \_\_\_\_\_

- a)  $m+n-1$
- b)  $m-n$
- c)  $m*n$
- d)  $m*n+1$

108. A binary cycle space forms a \_\_\_\_\_ over the two element field.

- a) triangular graph
- b) vector space
- c) binary tree
- d) hamiltonian graph

109. If  $G$  is a simple graph with  $n$ -vertices and  $n \geq 3$ , the condition for  $G$  has a Hamiltonian circuit is \_\_\_\_\_

- a) the degree of each vertex is at most  $n/2$
- b) the degree of each vertex is equal to  $n$
- c) the degree of every vertex is at least  $n+1/2$
- d) the degree of every vertex in  $G$  is at least  $n/2$

110. What is a separable graph?

- a) A disconnected graph by deleting a vertex
- b) A disconnected graph by removing an edge
- c) A disconnected graph by removing one edge and a vertex
- d) A simple graph which does not contain a cycle

111. How many edges are there in a complete graph of order 9?

- a) 35
- b) 36
- c) 45
- d) 19

112. How many cycles are there in a wheel graph of order 5?

- a) 6
- b) 10
- c) 25
- d) 7

113. Topological sorting of a graph represents \_\_\_\_\_ of a graph.

- a) linear probing
- b) linear ordering
- c) quadrilateral ordering
- d) insertion sorting

114. Breadth First Search traversal of a binary tree finds its application in \_\_\_\_\_

- a) Cloud computing
- b) Peer to peer networks
- c) Weighted graph
- d) Euler path

115. If the weight of an edge  $e$  of cycle  $C$  in a graph is larger than the individual weights of all other edges of  $C$ , then that edge \_\_\_\_\_

- a) belongs to an minimum spanning tree
- b) cannot belong to an minimum spanning tree
- c) belongs to all MSTs of the graph
- d) can not belong to the graph

116. For every spanning tree with  $n$  vertices and  $n$  edges what is the least number of different Spanning trees can be formed?

- a) 2
- b) 5
- c) 3
- d) 4

117. A complete undirected graph of  $n$  nodes can have maximum \_\_\_\_\_ spanning trees.

- a)  $n^{n+1}$
- b)  $n^{n-2}$
- c)  $n(n+1)2$
- d)  $n$

118. The spanning tree will be maximally acyclic if \_\_\_\_\_

- a) one additional edge makes a cycle in the tree
- b) two additional edges makes a cycle in the tree
- c) removing one edge makes the tree cycle free
- d) removing two edges make the tree cycle free

119. In a maximum spanning tree the weighted graph is of \_\_\_\_\_

- a) maximum number of edges
- b) maximum number of cyclic trees
- c) minimum number of vertices
- d) maximum weight

120. Which of the following relations is the reflexive relation over the set  $\{1, 2, 3, 4\}$ ?

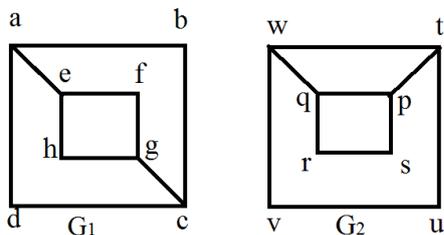
- a)  $\{(0,0), (1,1), (2,2), (2,3)\}$
- b)  $\{(1,1), (1,2), (2,2), (3,3), (4,3), (4,4)\}$
- c)  $\{(1,1), (1,2), (2,1), (2,3), (3,4)\}$
- d)  $\{(0,1), (1,1), (2,3), (2,2), (3,4), (3,1)\}$

121. Determine the characteristics of the relation  $aRb$  if  $a^2 = b^2$ .

- a) Transitive and symmetric
- b) Reflexive and asymmetry
- c) Trichotomy, antisymmetry, and irreflexive
- d) Symmetric, Reflexive, and transitive

Refer the following figure of Tree to answer the following Q No 122 to Q No 126

Refer the following figure to answer the Q.No129 to Q No.133



122. The degree of vertex 'a' is ----- and degree of adjacent vertices are-----

- a) 3 and 3,2,
- b) 3 and 3,2,1
- c) 3 and 3,2,2
- d) 3 and 3,1,2

123. The degree of vertex 'w' is ----- and degree of adjacent vertices are-----

- a) 3 and 3,2,
- b) 3 and 3,2,1
- c) 3 and 3,3,2
- d) 3 and 3,1,2

124. The degree of vertex 'e' is ----- and degree of adjacent vertices are-----

- a) 3 and 3,2,
- b) 3 and 3,2,1
- c) 3 and 3,3,2
- d) 3 and 3,1,2

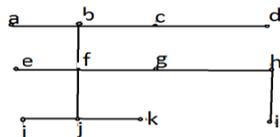
125. The degree of vertex 't' is ----- and degree of adjacent vertices are-----

- a) 3 and 3,2,
- b) 3 and 3,2,1
- c) 3 and 3,2,3
- d) 3 and 3,1,2

126. Graph G1 and G2 are

- a) Isomorphic
- b) Isthmus
- c) Spanning tree
- d) rooted Trees

Refer the following figure of Tree to answer the following Q No 127 to Q No 88



127. The eccentricity of vertex a is-----

- a) 5
- b) 10
- c) 12
- d) 13

128. The eccentricity of vertex d is-----

- a) 5
- b) 6
- c) 12
- d) 13

129. The eccentricity of vertex h is-----

- a) 5
- b) 6
- c) 12
- d) 13

130. The eccentricity of vertex f is-----

- a) 5

- b) 6
- c) 12
- d) 13

131. Radius of Tree is

- a) 5
- b) 6
- c) 3
- d) 2

132. Diameter of Tree is

- a) 5
- b) 6
- c) 3
- d) 2

133. Centre of the Tree is

- a) b
- b) c
- c) e
- d) f

134. The vertex with minimum eccentricity is called as----- of graph

- a) Radius
- b) Centre
- c) Diametre
- d) Cycle

135. A graph is said to be ----- graph if all the edges of a graph is assigned a non-negative real number

- a) Spanning
- b) Rooted
- c) Weighted graph
- d) Cycle

136. Some graphs have same structure but differs in representation is termed as

- a) Spanning
- b) Rooted
- c) Weighted graph
- d) Isomorphic

137. Every tree contains at least one -----vertex

- a) Pendent
- b) Isolated
- c) Weighted graph
- d) Isomorphic

138. The ----- of vertex is defined as number of edges incident on it

- a) degree
- b) edges
- c) Weights
- d) Isomorphic

139. Two vertices  $v_1$  and  $v_2$  in a graph are said to be----- to each other if they are the end vertices of the same edge

- a) incident
- b) connected
- c) cut
- d) adjacent

140. If all vertices of a graph  $G$  have same degree than  $G$  is called as

- a) Regular graph
- b) isomorphic graph
- c) Null graph
- d) Weighted graph

141. The vertex with minimum eccentricity is called as----- of graph

- a) radius
- b) centre
- c) diametre
- d) cycle

142. A graph is said to be ----- graph if all the edges of a graph is assigned a non-negative real number

- a) Unweighted graph
- b) Regular graph
- c) Weighted graph
- d) cycle

143 The expansion of  $n(n+1)(2n+1)/6$  is

- a)  $2+4+6+8+...$
- b)  $1+2+3+4+...$
- c)  $1^2 + 2^2 + 3^2 + 4^2 + ...$
- d)  $1^3 + 2^3 + 3^3 + 4^3 + ...$

144  $8^n - 3^n$  is multiple of

- a) 5
- b) 10

c) 12

d) 13

145 ----- is the process of proving general formula from particular cases.

a) Sudoku puzzle

b) Mathematical induction

c) Tower of Hanoi

d) Integer programming

146 A ----- of a set of distinct objects is an ordered arrangement of these objects

a) Permutation

b) Mathematical induction

c) Combination

d) Integer programming

147 What is the coefficient of  $X^{12}y^{13}$  in the expansion of  $(2x-3y)^{25}$  ?

a)  $C(25,13) (2)^{12} (-3)^{13}$

b) 100

c) zero

d) 1

148 Find number of arrangements of letters in the word TALLAHASSEE

a)  $11!/3!2!2!1!1!$

b) 100

c) zero

d) 1

149 If  $(kn + 1)$  pigeons entered in a hole then atleast one hole contains ----- or more pigeons

a)  $k+1$

b)  $k$

c)  $2k$

d) 1

150 How many integers between 1 to 200 are divisible by 7 or 11?

a) 46

b) 100

c) 200

d) 10

