PUNE VIDYARTHI GRIHA'S

COLLEGE OF SCIENCE AND TECHNOLOGY

Affiliated to University of Mumbai

Question Bank

Class: F.Y.B. Sc.IT **Semester: I**

Subject: Discrete Mathematics

Q. Unit 1

1 The set O of odd positive integers less than 10 can be expressed by _____

a) {1, 2, 3}
b) {1, 3, 5, 7, 9}
c) {1, 2, 5, 9}
d) {1, 5, 7, 9, 11}

2 Power set of empty set has exactly _____ subset.

a) One
b) Zero
c) Two
d) Three

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

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

4 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)}

5 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}

6 The set of positive integers is _____

a) Infinite
b) Finite

c) Subset
d) Empty

7 What is the Cardinality of the Power set of the set {0, 1, 2}?
a) 8
b) 6
c) 7
d) 9

8 The members of the set S = {x | x 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}

9 {x: x is an integer neither positive nor negative} is _____
a) Empty set
b) Non-empty set
c) Finite set
d) Non- empty and Finite set

10 Write set {1, 5, 15, 25,…} in set-builder form.
a) {x: either x=1 or x=5n, where n is a real number}
b) {x: either x=1 or x=5n, where n is a integer}
c) {x: either x=1 or x=5n, where n is an odd natural number}
d) {x: x=5n, where n is a natural number}

11 Express {x: x= n/ (n+1), n is a natural number less than 7} in roster form.
a) {$^1/_2$, $^2/_3$, $^4/_5$, $^6/_7$}
b) {$^1/_2$, $^2/_3$, $^3/_4$, $^4/_5$, $^5/_6$, $^6/_7$, $^7/_8$}
c) {$^1/_2$, $^2/_3$, $^3/_4$, $^4/_5$, $^5/_6$, $^6/_7$}
d) Infinite set

12 Number of power set of {a, b}, where a and b are distinct elements.
a) 3
b) 4
c) 2
d) 5

13 {x: x ∈ N and x is prime} then it is _____
a) Infinite set
b) Finite set
c) Empty set
d) Not a set

14 Convert set {x: x is a positive prime number which divides 72} in roster form.
a) {2, 3, 5}
b) {2, 3, 6}
c) {2, 3}
d) {∅}

15 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}

16 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}

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

18 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}

19 The difference of {1, 2, 3} and {1, 2, 5} is the set _____
a) {1}
b) {5}
c) {3}
d) {2}

20 The complement of the set A is _____
a) A – B
b) U – A
c) A – U
d) B – A

21 The set difference of the set A with null set is _____
a) A
b) null
c) U
d) B

22 If n(A)=20 and n(B)=30 and n(A U B) = 40 then n(A ∩ B) is?
a) 20
b) 30
c) 40
d) 10

23 In the given figure the if n(A)=20,n(U)=50,n(C)=10 and n(A∩B)=5 then n(B)=?
a) 35

b) 20
c) 30
d) 10

24 Let the students who likes table tennis be 12, the ones who like lawn tennis 10, those who like only table tennis are 6, then number of students who likes only lawn tennis are, assuming there are total of 16 students.
a) 16
b) 8
c) 4
d) 10

25 If set A has 4 elements and B has 3 elements then set n(A X B) is?
a) 12
b) 14
c) 24
d) 7

26 If set A and B have 3 and 4 elements respectively then the number of subsets of set (A X B) is?
a) 1024
b) 2048
c) 512
d) 4096

27 Which of the following statement is a proposition?
a) Get me a glass of milkshake
b) God bless you!
c) What is the time now?
d) The only odd prime number is 2

28 What is the value of x after this statement, assuming the initial value of x is 5?
'If x equals to one then x=x+2 else x=0'.
a) 1
b) 3
c) 0
d) 2

29 Let P: I am in Bangalore.; Q: I love cricket.; then $q \rightarrow p$(q implies p) is?
a) If I love cricket then I am in Bangalore
b) If I am in Bangalore then I love cricket
c) I am not in Bangalore
d) I love cricket

30 Let P: If Sahil bowls, Saurabh hits a century.; Q: If Raju bowls, Sahil gets out on first ball. Now if P is true and Q is false then which of the following can be true?
a) Raju bowled and Sahil got out on first ball
b) Raju did not bowled
c) Sahil bowled and Saurabh hits a century
d) Sahil bowled and Saurabh got out

31 Let P: I am in Delhi.; Q: Delhi is clean.; then q ∧ p(q and p) is?
a) Delhi is clean and I am in Delhi
b) Delhi is not clean or I am in Delhi
c) I am in Delhi and Delhi is not clean
d) Delhi is clean but I am in Mumbai

32 Let P: This is a great website, Q: You should not come back here. Then 'This is a great website and you should come back here.' is best represented by?
a) ~P V ~Q
b) P ∧ ~Q
c) P V Q
d) P ∧ Q

33 Let P: We should be honest., Q: We should be dedicated., R: We should be overconfident. Then 'We should be honest or dedicated but not overconfident.' is best represented by?
a) ~P V ~Q V R
b) P ∧ ~Q ∧ R
c) P V Q ∧ R
d) P V Q ∧ ~R

34 What is the dual of (A ∧ B) v (C ∧ D)?
a) (A V B) v (C v D)
b) (A V B) ^ (C v D)
c) (A V B) v (C ∧ D)
d) (A ∧ B) v (C v D)

35 Negation of statement (A ∧ B) → (B ∧ C) is _____
a) (A ∧ B) →(~B ∧ ~C)
b) ~(A ∧ B) v (B v C)
c) ~(A →B) →(~B ∧ C)
d) None of the mentioned

36 ~ A v ~ B is logically equivalent to?
a) ~ A → ~ B
b) ~ A ∧ ~ B
c) A → ~B
d) B V A

37 If A is any statement, then which of the following is a tautology?
a) A ∧ F
b) A ∨ F
c) A ∨ ¬A
d) A ∧ T

38 If A is any statement, then which of the following is not a contradiction?
a) A ∧ ¬A
b) A ∨ F
c) A ∧ F
d) A

39 A compound proposition that is neither a tautology nor a contradiction is called a _____

a) Contingency
b) Equivalence
c) Condition
d) Inference

40 What is the contrapositive of the conditional statement? “The home team misses whenever it is drizzling?”

a) If it is drizzling, then home team misses
b) If the home team misses, then it is drizzling
c) If it is not drizzling, then the home team does not misses
d) If the home team wins, then it is not drizzling

41 What is the converse of the conditional statement “If it ices today, I will play ice hockey tomorrow.”

a) “I will play ice hockey tomorrow only if it ices today.”
b) “If I do not play ice hockey tomorrow, then it will not have iced today.”
c) “If it does not ice today, then I will not play ice hockey tomorrow.”
d) “I will not play ice hockey tomorrow only if it ices today.”

42 What are the inverse of the conditional statement “If you make your notes, it will be a convenient in exams.”

a) “If you make notes, then it will be a convenient in exams.”
b) “If you do not make notes, then it will not be a convenient in exams.”
c) “If it will not be a convenient in exams, then you did not make your notes.”
d) “If it will be a convenient in exams, then you make your notes

43 $p \rightarrow q$ is logically equivalent to _____

a) $\neg p \vee \neg q$
b) $p \vee \neg q$
c) $\neg p \vee q$
d) $\neg p \wedge q$

44 $\neg (p \leftrightarrow q)$ is logically equivalent to _____

a) $q \leftrightarrow p$
b) $p \leftrightarrow \neg q$
c) $\neg p \leftrightarrow \neg q$
d) $\neg q \leftrightarrow \neg p$

45 $p \leftrightarrow q$ is logically equivalent to _____

a) $(p \rightarrow q) \rightarrow (q \rightarrow p)$
b) $(p \rightarrow q) \vee (q \rightarrow p)$
c) $(p \rightarrow q) \wedge (q \rightarrow p)$
d) $(p \wedge q) \rightarrow (q \wedge p)$

46 A row of the truth table in which all the premises are true is called

a) Conclusion
b) Critical row
c) Important row
d) hypothesis

47 If the conclusion in every critical row is true, then the argument form is

a) modus ponens
b) modus tollens
c) valid
d) invalid

48 An argument form consisting of two premises and a conclusion is called a
a) Syllogism
b) Argument form
c) Valid
d) Invalid

49 If any of the conclusion in critical row is false then the argument form is
a) Modus ponens
b) Modus tollens
c) Valid
d) Invalid

50 You are about to leave for school in the morning and discover that you don't have your glasses. You know the following statements are true:
i. If I was reading the newspaper in the kitchen, then my glasses are on the kitchen table.
ii. If my glasses are on the kitchen table, then I saw them at breakfast.
iii. I did not see my glasses at breakfast.
iv. I was reading the newspaper in the living room or I was reading the newspaper in the kitchen.
v. If I was reading the newspaper in the living room then my glasses are on the coffee table.
Where are the glasses?
a) Living room
b) Kitchen table
c) Coffee table
d) Lost glasses

Q. Unit 2

1 Let P (x) denote the statement "x >7." Which of these have truth value true?
a) P (0)
b) P (4)
c) P (6)
d) P (9)

2 "The product of two negative real numbers is not negative." Is given by?
a) $\exists x\ \forall y\ ((x < 0) \wedge (y < 0) \rightarrow (xy > 0))$
b) $\exists x\ \exists y\ ((x < 0) \wedge (y < 0) \wedge (xy > 0))$
c) $\forall x\ \exists y\ ((x < 0) \wedge (y < 0) \wedge (xy > 0))$
d) $\forall x\ \forall y\ ((x < 0) \wedge (y < 0) \rightarrow (xy > 0))$

3 Express, "The difference of a real number and itself is zero" using required operators.
a) $\forall x\ (x - x! = 0)$
b) $\forall x\ (x - x = 0)$
c) $\forall x\ \forall y\ (x - y = 0)$
d) $\exists x\ (x - x = 0)$

4 The premises $(p \wedge q) \vee r$ and $r \rightarrow s$ imply which of the conclusion?
a) $p \vee r$
b) $p \vee s$
c) $p \vee q$
d) $q \vee r$

5 What rules of inference are used in this argument?
"Jay is an awesome student. Jay is also a good dancer. Therefore, Jay is an awesome student and a good dancer."
a) Conjunction
b) Modus ponens
c) Disjunctive syllogism
d) Simplification

6 "Parul is out for a trip or it is not snowing" and "It is snowing or Raju is playing chess" imply that _____
a) Parul is out for trip
b) Raju is playing chess
c) Parul is out for a trip and Raju is playing chess
d) Parul is out for a trip or Raju is playing chess

7 Let the statement be "If n is not an odd integer then square of n is not odd.", then if P(n) is "n is not an odd integer" and Q(n) is "(square of n) is not odd." For direct proof we should prove _____
a) $\forall n\ P((n) \rightarrow Q(n))$
b) $\exists\ n\ P((n) \rightarrow Q(n))$
c) $\forall n\ \sim(P((n)) \rightarrow Q(n))$
d) $\forall n\ P((n) \rightarrow \sim(Q(n)))$

8 Which of the following can only be used in disproving the statements?
a) Direct proof
b) Contrapositive proofs
c) Counter Example
d) Mathematical Induction

9 Let the statement be "If n is not an odd integer then sum of n with some not odd number will not be odd.", then if P(n) is "n is an not an odd integer" and Q(n) is "sum of n with some not odd number will not be odd." A proof by contraposition will be _____
a) $\forall n\ P((n) \rightarrow Q(n))$
b) $\exists\ n\ P((n) \rightarrow Q(n))$
c) $\forall n\ \sim(P((n)) \rightarrow Q(n))$
d) $\forall n\ (\sim Q((n)) \rightarrow \sim(P(n)))$

10 In proving $\sqrt{5}$ as irrational, we begin with assumption $\sqrt{5}$ is rational in which type of proof?
a) Direct proof
b) Proof by Contradiction
c) Vacuous proof
d) Mathematical Induction

11 The greatest common divisor of 12 and 18 is?
a) 2

b) 3
c) 4
d) 6

12 The greatest common divisor of 7 and 5 is?
a) 1
b) 2
c) 5
d) 7

13 The quotient when 19 is divided by 6 is?
a) 1
b) 2
c) 3
d) 0

14 The remainder when 111 is divided by 12 is?
a) 0
b) 1
c) 2
d) 3

15 The quotient and remainder when -1 is divided by 3 is?
a) -1 and -1
b) -1 and 2
c) 1 and 2
d) -1 and -2

16 The value of 12 mod 3 is?
a) 0
b) 1
c) 2
d) 3

17 The value of 155 mod 9 is?
a) 0
b) 1
c) 2
d) 3

18 If a|b and a|c, then?
a) a|bc
b) c|a
c) a|(b+c)
d) b|a

19 The quotient and remainder when 18 is divided by 5 is?
a) 2 and 3
b) 1 and 2
c) 3 and 2
d) 3 and 3

20 The value of 15 mod 11 is?
a) 1
b) 2
c) 3
d) 4

21 A floor function map a real number to _____
a) smallest previous integer
b) greatest previous integer
c) smallest following integer
d) none of the mentioned

22 A ceil function map a real number to _____
a) smallest previous integer
b) greatest previous integer
c) smallest following integer
d) greatest following result

23 Floor(2.4) + Ceil(2.9) is equal to _____
a) 4
b) 6
c) 5
d) 10

24 If x, and y are positive numbers both are less than one, then maximum value of floor(x + y) is?
a) 0
b) 1
c) 2
d) -1

25 If x, and y are positive numbers both are less than one, then maximum value of ceil(x + y) is?
a) 0
b) 1
c) 2
d) -1

26 If X = Floor(X) = Ceil(X) then _____
a) X is a fractional number
b) X is a Integer
c) X is less than 1
d) x is greater than 1

27 The number of factors of prime numbers are _____
a) 2
b) 3
c) Depends on the prime number
d) 5

28 How many prime numbers are there between 1 to 20?
a) 5
b) 6

c) 7
d) 8

29 If a, b, c, d are distinct prime numbers with an as smallest prime then a * b * c * d is a _____
a) Odd number
b) Even number
c) Prime number
d) Algebraic number

30 If a, b are two distinct prime number than a highest common factor of a, b is _____
a) 2
b) 0
c) 1
d) ab

31 Let Q(n) be the predicate “n is a factor of 8.” What is the truth set of Q(n) if the domain of n is the set of all positive integers?
a) $\{2, 4\}$
b) $\{2, 4, 8\}$
c) $\{1, 2, 4, 8\}$
d) $\{-8, -4, -2, -1, 1, 2, 4, 8\}$

32 Which of the following is false?
a) The product of any two odd integers is odd.
b) The difference of any two odd integers is odd.
c) The difference of any two even integers is even.
d) The product of any two even integers is even.

33 Find integers q and r such that n = dq + r and 0 ≤ r < d for n = 59 and d = 9.
a) $q = 6, r = 5$
b) $q = 5, r = 6.$
c) $q = 7, r = -4$
d) $q = 8, r = 5$

34 Which of the following is not a rational no?
a) 10/3
b) 0
c) 2/0
d) -5

35 Which of the following is an appropriate method to prove "Every positive even integer less than 26 can be expressed as a sum of three or fewer perfect squares."?
a) Method of Exhaustion
b) Counterexample
c) Method of Generalizing from the Generic Particular
d) Contradiction Method

36 If k is an integer, what is ceiling (k - 1/2)?
a) $k - 1$
b) k
c) $k + 1$
d) $k - 1/2$

37 The inverse of "∀x ∈ R, if x > 2 then $x^2 > 4$."
a) ∃x such that if x > 2 then $x^2 > 4$.

b) $\exists x$ such that if $x \leq 2$ then $x^2 \leq 4$.
c) $\exists x$ such that if $x^2 \leq 4$ then $x \leq 2$.
d) $\forall x \in R$, if $x \leq 2$ then $x^2 \leq 4$.

38 $\sim (\forall x$, if $P(x)$ then $Q(x)) \equiv$ _____.
a) $\exists x$ such that $P(x)$ and $\sim Q(x)$.
b) $\exists x$ such that if $P(x)$ then $Q(x)$.
c) $\exists x$ such that if $\sim P(x)$ then $\sim Q(x)$.
d) $\exists x$ such that $\sim P(x)$ and $\sim Q(x)$.

39 Which of the following is not equivalent to "$\forall$ integers n, if n^2 is even then n is even."?
a) All even integers have even squares.
b) If the square of an integer is even, then that integer is even.
c) Any integer with an even square is even.
d) Given any integer whose square is even, that integer is itself even.

40 $\forall$ is _____ and $\exists$ is _____.
a) an existential quantifier, an universal quantifier
b) an universal quantifier, an existential quantifier
c) an universal quantifier, a logical connective
d) an existential quantifier, a logical connective

41 How many quantifiers are there in mathematical logic?
a) 2
b) 3
c) 4
d) 5

42 Which of the following is not the valid argument forms?
a) Modus Ponens
b) Modus Tollens
c) Converse Error
d) Transitivity

43 The syllogism "$p \rightarrow q$; $\sim p$; $\therefore \sim q$" is _____.
a) Modus Ponens
b) Modus Tollens
c) Converse Error
d) Inverse error

44 The syllogism "$p \rightarrow q$; p; $\therefore$ q" is _____.
a) Modus Ponens
b) Modus Tollens
c) Converse Error
d) Inverse error

45 The syllogism "$p \rightarrow q$; $\sim q$; $\therefore \sim p$" is _____.
a) Modus Ponens
b) Modus Tollens
c) Converse Error
d) Inverse error

46 "There is no green fire truck." is _____ statement.
a) a conditional
b) an universal
c) an existential
d) an existential conditional

47 A _____ is a sentence that contains a finite number of variables and becomes a statement when specific values are substituted for the variables.

a) Predicate
b) Quantifier
c) Conditional
d) Biconditional

48 Let P(x) be the predicate "12/x is an integer". Then which of the following is false?

a) P (-3)
b) P (0)
c) P (2)
d) P (6)

49 Which of the following is not equivalent way of expressing "∀ basketball players x, x is tall."?

a) Every basketball player is tall.
b) All people who are basketball players are tall.
c) Anyone who is a basketball player is a tall person.
d) Anyone who is tall is a basketball player.

50 ~(∀ x in D, ∃y in E such that P(x, y))

a) ∃x in D such that ∀y in E, ~P(x, y).
b) ∀x in D, ∃y in E such that ~P(x, y).
c) ∀x in D, ∃y in E such that P(x, y).
d) ∃x in D such that ∀y in E, P(x, y).

Q. # Unit 3

1. In the principle of mathematical induction, which of the following steps is mandatory?
   a) induction hypothesis
   b) inductive reference
   c) induction set assumption
   d) minimal set representation
2. For every natural number k, which of the following is true?
   a) $(mn)^k = m^k n^k$
   b) m*k = n + 1
   c) $(m+n)^k = k + 1$
   d) $m^k n = mn^k$
3. By induction hypothesis, the series $1^2 + 2^2 + 3^2 + \ldots + p^2$ can be proved equivalent to _____
   a) p2+27
   b) p∗(p+1)∗(2p+1)/6
   c) p∗(p+1)4
   d) $p+p^2$
4. Which of the following is the base case for $4^{n+1} > (n+1)^2$ where n = 2?
   a) 64 > 9
   b) 16 > 2
   c) 27 < 91
   d) 54 > 8
5. What is the induction hypothesis assumption for the inequality m ! > 2^m where m>=4?
   a) for m=k, $k+1!>2^k$ holds

b) for m=k, $k!>2^k$ holds
c) for m=k, $k!>3^k$ holds
d) for m=k, $k!>2^{k+1}$ holds

6. 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

7. 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) $b_n=b_{n-1}+1$

8. 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) $a_n=nn-2/6n6^n$

9. 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

10. 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

11. Which of the following function f: Z X Z → 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

12. 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

13. 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) $f^{-1}(y) = (y - 2)$

14. 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) it is the set of whole numbers for which a function is defined.

15. 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 for which a function can take values
c) it is set of natural numbers for which a function is defined
d) the minimal set of numbers for which a function is defined

16. An injection is a function which is?
a) many-one
b) one-one
c) onto
d) surjection

17. What is domain of function $f(x)= x^{1/2}$?
a) $(2, \infty)$
b) $(-\infty, 1)$
c) $[0, \infty)$
d) $(-\infty,\infty)$

18. 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) $f(x) = y$ for all x in X

19. If $f(x) = y$ then $f^{-1}(y)$ is equal to _____
a) y
b) x
c) x^2
d) y^2

20. 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) from A to A

21. If f is a function defined from R to 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) 3x + 5

22. For the sequence $a_n = 6. (1/3)^n$, a_4 is _____
a) 2/25
b) 2/27
c) 2/19
d) 2/13

23. What is the base case for the inequality $7^n > n^3$, where n = 3?
a) 652 > 189
b) 42 < 132
c) 343 > 27
d) 42 <= 431

24. According to principle of mathematical induction, if $P(k+1) = m^{(k+1)} + 5$ is true then _____ must be true.
    a) $P(k) = 3m^{(k)}$
    b) $P(k) = m^{(k)} + 5$
    c) $P(k) = m^{(k+2)} + 5$
    d) $P(k) = m^{(k)}$
25. A function is said to be bijective function if it is
    a) one – one
    b) onto
    c) surjective
    d) one-one and onto
26. If f and g are injective functions then its composite function gof is
    a) one – one
    b) onto
    c) surjective
    d) one-one and onto
27. If f and g are invertible functions then
    a) $(gof)^{-1} = g^{-1}o\ f^{-1}$
    b) $(gof)^{-1} = gf$
    c) $(gof)^{-1} = f^{-1}o\ g^{-1}$
    d) $(gof)^{-1} = fg$
28. A function $f : A \rightarrow B$ is said to be everywhere defined function if
    a) range f = A
    b) Domain f = B
    c) range f = B
    d) Domain f = A
29. Any infinite subset of a countable set is
    a) finite
    b) countable
    c) infinite
    d) empty
30. If S is countable set and $g : S \rightarrow T$ is surjective then T is
    a) finite
    b) singleton
    c) infinite
    d) countable
31. A formula developed in which every previous term is used to define the next term,
    is called
    a) explicit
    b) induction
    c) recursive
    d) countable
32. For A = {1,2,3,4} and B = {1,2,3,4} the function, f = {(1,1), (23), (3,4), (4, 2)} is
    a) One- one
    b) Onto
    c) Neither one-one nor onto
    d) Both one –one and onto

33. For A = {1,2,3,4} , B = {1,2,3,4} and f = { (1,3), (2,1), (3,4), (4,3)} and g = { (1,2), (2,3), (3,1) (4,1)} , fog is

a) {(1,1), (2,2), (3,4), (4,3)}
b) {(1,1), (2,4), (3,3), (4,3)}
c) {(1,1), (2,1), (3,4), (4,4)}
d) {(1,1), (2,4), (3,4), (4,3)}

34. If A = B = Z and let f(x) = 2x + 3, g(x) 3x + 2. Then gof is

a) 6x + 11
b) 6x + 7
c) 6x + 5
d) 6x + 2

35. Let f be a function from A = {1, 2, 3, 4} to B = {a, b, c, d}. Determine which f^{-1} is a function.

a) {(a,1), (a,2), (c,3), (d,4)}
b) {(b, 1), (d, 2), (c, 1), (d,3)}
c) {(a,1), (c,2), (d,4), (b,3)}
d) {(a,1), (a,2), (a,4), (b,3)}

36. Sets A and B are said to have same cardinalities if a function $f : A \rightarrow B$ is

a) injective
b) surjective
c) Neither injective nor surjective
d) Bijective

37. Determine for A ={a, b, c, d} and B = {1, 2, 3}, which of the following is a function?

a) f = {(a,3), (b,2), (c,1)}
b) g = {(a,1), (b,1), (c,1), (d, 1)}
c) h = {(a,2), (c,3), (d,3), (c,4)}
d) w = {(a,3), (a,2), (b,1), (c,4)}

38. The common difference of the sequence 5, 8, 11, 14, …….. is

a) 0
b) 1
c) 3
d) -3

39. $2^1 + 2^2 + 2^3 + 2^4 + \ldots\ldots 2^n =$

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

40. The fifth term of the sequence $a_n = 2n + 3$ is

a) 13
b) -13
c) -7
d) 7

41. The sum of the series $1 + (1/3) + (1/3^2) + (1/3^3) + \ldots\ldots$

a) 2
b) 3/2
c) 2/3
d) 4/3

42. The function $f : R \rightarrow R$ defined by $f(x) = 3 - 4x$ is
    a) Onto
    b) Not onto
    c) Not one-one
    d) Not bijective
43. The function $f : Z \rightarrow R$ defined by $f(x) = 4x + 7$, $x \in Z$ is
    a) one-one
    b) onto
    c) bijective
    d) Even
44. Let $f : R \rightarrow R$ be defined by $f(x) = 1x \ \forall \ x \in R$. Then f is
    a) one-one
    b) onto
    c) bijective
    d) f is not defined
45. Which of the following functions from Z into Z are bijective?
    a) $f(x) = x^3$
    b) $f(x) = x + 2$
    c) $f(x) = 2x + 1$
    d) $f(x) = x^2 + 1$
46. Let $f : R \rightarrow R$ be the functions defined by $f(x) = x^3 + 5$. Then $f^{-1}(x)$ is
    a) $(x+5)^{1/3}$
    b) $(x-5)^{1/3}$
    c) $(5-x)^{1/3}$
    d) $5 - x$
47. The mapping $f : N \rightarrow N$ is given by $f(n) = 1 + n^2$, $n \in N$ when N is the set of natural
    numbers is
    a) one-one and onto
    b) onto but not one-one
    c) one-one but not onto
    d) neither one-one nor onto
48. The function $f : R \rightarrow R$ given by $f(x) = x^3 - 1$ is
    a) a one-one function
    b) an onto function
    c) a bijection
    d) neither one-one nor onto
49. If $f : R \rightarrow R$ and $g : R \rightarrow R$ defined by $f(x) = 2x + 3$ and $g(x) = x^2 + 7$, then the value of x
    for which $f(g(x)) = 25$ is
    a) ± 1
    b) ± 2
    c) ± 3
    d) ± 4
50. In the function $y = f(x)$, 'y' is classified as
    a) dependent variable
    b) lower limit variable
    c) upper limit variable
    d) independent variable

Q. Unit 4

1 A relation on a set A is a relation from _____ to _____.

a) A; B
b) A; A
c) B; B
d) B; A

2 The congruence modulo 2 relation E is defined from Z to Z as follows:

$$\text{For all integers m and n, mEn} \Leftrightarrow \text{m} - \text{n is even.}$$

Which of the following is true?

a) $5E2$
b) 3E0
c) -1E7
d) 4E1

3 The congruence modulo 3 relation, T, is defined from Z to Z as follows:

$$\text{For all integers m and n, mTn} \Leftrightarrow 3 \mid (\text{m} - \text{n}).$$

Which of the following is true?

a) 10T1
b) 8T1
c) 5T3
d) 9T4

4 Let A = {3, 4, 5} and B = {4, 5, 6} and let R be the "less than" relation. That is,

$$\text{for all } (\text{x}, \text{y}) \in \text{A} \times \text{B}, \text{xRy} \Leftrightarrow \text{x} < \text{y}.$$

State explicitly which ordered pairs are in R

a) $\{(4,5),(4,6),(6,4)\}$
b) $\{(3,4),(3,5),(3,6),(4,4),(4,5),(4,6),(5,4),(5,5),(5,6)\}$
c) $\{(3,4),(3,5),(3,6),(4,5),(4,6),(5,6)\}$
d) $\{(3,5),(4,4),(4,5),(4,6),(5,4),(5,5),(5,6)\}$

5 If R is a relation from A to B, x ∈ A, and y ∈ B, the notation xRy means that _____.

a) x is related to y by R
b) x is not related to y by R
c) y is related to y by R
d) x is related to x by R

6 If R is a relation from A to B, x ∈ A, and y ∈ B, the notation x $\not R$ y means that _____.

a) x is related to y by R
b) x is not related to y by R
c) y is related to y by R
d) x is related to x by R

7 For a relation R on a set A to be reflexive means that ____

a) for all x and y in A, if xRy then yRx
b) for some x in A, x R x
c) for all x in A, x R x
d) for all x, y, and z in A, if xRy and yRz then xRz

8 For a relation R on a set A to be symmetric means that _____.

a) for all x and y in A, if xRy then yRx
b) for all x, y, and z in A, if xRy and yRz then xRz
c) for some x in A, x R x
d) for all x in A, x R x

9 For a relation R on a set A to be transitive means that _____.

a) for some x in A, x R x
b) for all x in A, x R x
c) for all x, y, and z in A, if xRy and yRz then xRz
d) for all x and y in A, if xRy then yRx

10 To show that a relation R on an infinite set A is reflexive, you suppose that _____ and you show that _____.
a) x and y are any elements of A such that x R y; y R x
b) x, y, and z are any elements of A such that xRy and y R z; x R z
c) x is any element of A; x R x
d) for some x in A, x R x

11 To show that a relation R on an infinite set A is symmetric, you suppose that _____ and you show that _____.
a) x and y are any elements of A such that x R y; y R x
b) x is any element of A; x R x
c) x, y, and z are any elements of A such that xRy and y R z; x R z
d) for all x and y in A, if xRy then yRx

12 To show that a relation R on an infinite set A is transitive, you suppose that _____ and you show that _____.
a) x, y, and z are any elements of A such that xRy and y R z; x R z
b) x and y are any elements of A such that x R y; y R x
c) x is any element of A; x R x
d) for all x, y, and z in A, if xRy and yRz then xRz

13 Let A be a set and R a relation on A. R is an equivalence relation if, and only if, R is
a) Reflexive only
b) Reflexive and transitive
c) Reflexive, symmetric and transitive
d) Only transitive

14 Let A = {0, 1, 2, 3, 4} and define a relation R on A as follows:
R = {(0, 0), (0, 4), (1, 1), (1, 3), (2, 2), (3, 1), (3, 3), (4, 0), (4, 4)}.
The equivalence class of 4 is
a) [4] = {1, 0}
b) [4] = {2}
c) [4] = {3, 0}
d) [4] = {0, 4}

15 If A is a set, R is an equivalence relation on A, and a and b are elements of A, then
a) either [a]∩[b]=∅ or [a]=[b]
b) [a]∩[b]=∅ and [a]=[b]
c) [a]∩[b]=∅
d) [a]=[b]

16 Determine which of the following congruences are true?
a) $12 \equiv 6(mod\ 5)$
b) $-8 \equiv 6(mod\ 4)$
c) $3 \equiv 6(mod\ 2)$
d) $12 \equiv 7(mod\ 5)$

17 Determine which of the following congruence relations are false?

a) $12 \equiv 6(mod\ 5)$
b) $12 \equiv 7(mod\ 5)$
c) $3 \equiv 3(mod\ 7)$
d) $10 \equiv 5(mod\ 5)$

18 Let A = {a, b, c, d} and define a relation R on A as follows:

R = {(a, a), (b, b), (b, d), (c, c), (d, b), (d, d)}

The equivalence class of b is

a) [b]={c}
b) [b] = {b, d}
c) [b] = {a, c}
d) [b]={d}

19 The binary relation {(1,1), (2,1), (2,2), (2,3), (2,4), (3,1), (3,2)} on the set {1, 2, 3} is _____

a) Reflective, symmetric and transitive
b) Irreflexive, symmetric and transitive
c) Neither reflective, nor irreflexive but transitive
d) Irreflexive and antisymmetric

20 Suppose a relation R = {(3, 3), (5, 5), (5, 3), (5, 5), (6, 6)} on S = {3, 5, 6}. Here R is known as _____

a) equivalence relation
b) reflexive relation
c) symmetric relation
d) transitive relation

21 Determine the partitions of the set {3, 4, 5, 6, 7} from the following subsets.

a) {3,5}, {3,6,7}, {4,5,6}
b) {3}, {4,6}, {5}, {7}
c) {3,4,6}, {7}
d) {5,6}, {5,7}

22 Determine the set of all integers a such that a ≡ 3 (mod 7) such that $-21 \leq x \leq 21$.

a) {−21, −18, −11, −4, 3, 10, 16}
b) {−21, −18, −11, −4, 3, 10, 17, 24}
c) {−24, -19, -15, 5, 0, 6, 10}
d) {−23, −17, −11, 0, 2, 8, 16}

23 Let A = {3, 4, 5} and B = {4, 5, 6} and let S be the "divides" relation. That is,

for all $(x, y) \in A \times B, xSy \Leftrightarrow x \mid y$.

State explicitly which ordered pairs are in s^{-1}

a) $\{(3,4), (3,5), (3,6), (4,4), (4,5), (4,6), (5,4), (5,5), (5,6)\}$
b) {(3, 6), (4, 4), (5, 5)}
c) {(6, 3), (4, 4), (5, 5)}
d) $\{(3,4), (3,5), (3,6), (4,4)\}$

24 Which of the following relation is reflexive?

a) R = {(0, 0), (0, 1), (0, 3), (1, 0), (1, 1), (2, 2), (3, 0), (3, 3)}
b) S = {(0, 0), (0, 2), (0, 3), (2, 3)}
c) T = {(0, 1), (2, 3)}

d) L = {(1, 1), (2, 2), (3, 3)}

25 Define a relation R on R (the set of all real numbers) as follows: For all x, y ∈ R,

$$xRy \Leftrightarrow x < y$$

then

a) R is a reflexive relation
b) R is symmetric relation
c) R is transitive relation
d) R is an equivalence relation

26 A loop in a graph is _____.

a) an edge with a single endpoint
b) Parallel edge
c) An edge with two end points
d) An isolated vertex

27 A minimum spanning tree for a connected, weighted graph is _____.

a) a spanning tree that has the least possible total weight compared to all other spanning trees for the graph
b) a spanning tree that has maximum weight compared to all other spanning trees for the graph
c) a spanning tree of any weight
d) depends on the graph

28 At each stage of Dijkstra's algorithm, the vertex that is added to the tree is a vertex in the fringe whose label is a _____

a) Maximum among all those in the fringe
b) Minimum among all those in the fringe
c) Whose Label is one
d) Whose Label is three

29 In Dijkstra's algorithm, a vertex is in the fringe if it is _____ vertex in the tree that is being built up.

a) Adjacent to a
b) Not adjacent vertices
c) Adjacent edges
d) Minimum weighted edge

30 A binary tree is a rooted tree in which _____.

a) Every parent has at least two children
b) Every parent has more two children
c) Every parent has exactly two children
d) Every parent has at most two children

31 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

32 An n-vertex graph has _____ edges.

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

33 The handshake theorem says that the total degree of a graph is _____.

a) equal to the number of edges of the graph
b) not equal to twice the number of edges of the graph
c) equal to twice the number of edges of the graph
d) equals to number of vertices

34 In any graph the number of vertices of odd degree is _____.

a) an even number
b) Prime number
c) Odd number
d) Depends on graph

35 The degree of a vertex in a graph is _____.

a) the number of edges that are incident on the vertex, with an edge that is a loop counted twice
b) the number of edges that are incident on the vertex, with an edge that is a loop counted thrice
c) the number of edges that are incident on the vertex, with an edge that is a loop counted only once
d) can't be determined

36 A directed graph or digraph can have directed cycle in which _____

a) starting node and ending node are different
b) starting node and ending node are same
c) minimum four vertices can be there
d) ending node does not exist

37 The graph representing universal relation is called _____

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

38 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

39 Disconnected components can be created in case of _____

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

40 A simple graph can have _____

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

41 Degree of a graph with 12 vertices is _____

a) 25
b) 56

c) 24
d) 212

42 In a finite graph the number of vertices of odd degree is always _____
a) even
b) odd
c) even or odd
d) infinite

43 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

44 In a _____ the degree of each and every vertex is equal.
a) regular graph
b) point graph
c) star graph
d) Euler graph

45 If each and every vertex in G has degree at most 23 then G can have a vertex colouring of _____
a) 24
b) 23
c) 176
d) 54

46 If G is the forest with 54 vertices and 17 connected components, G has _____ total number of edges.
a) 38
b) 37
c) 17/54
d) 17/53

47 The minimum number of edges in a connected cyclic graph on n vertices is _____
a) n – 1
b) n
c) 2n+3
d) n+1

48 Every Isomorphic graph must have _____ representation.
a) cyclic
b) adjacency list
c) tree
d) adjacency matrix

49 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

50 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

Q. Unit 5

1 If A and $\bar{A}$ are complementary events, then P($\bar{A}$) = …….
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) = …….
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(A∩B) = …….
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) ½
b) 1/6
c) 1/36
d) 1/3

6 Which one of the following can be probability ratio ?
a) 3/2
b) 17/11
c) 2/3
d) -1/2

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

a) ¼
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 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

14 If P(A) denotes probability of event A then …….

a) $0 \geq P(A) \geq 1$ 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

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

a) ¼
b) ½

c) ¾
d) 1

16 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

17 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

18 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) $\bar{A} \cap B$
d) $A \cap \bar{B}$

19 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) $A \cup B$
$c)$ $\bar{A} \cap B$
c) $A \cap \bar{B}$

20 For variable x can assume values 10 or 50 with probabilities ¾ and ¼ respectively then expected value of variable is …….
a) 30
b) 20
c) 40
d) 10

21 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) 7/3
b) 3/7
c) 7/10
d) 3/10

22 A variable x capable of taking values x1, x2, x3, ……, xn with respective probabilities p1, p2, p3, ….. , pn then it is called …….
a) Continuous random
b) Continuous
c) Discrete random variable
d) Discrete

23 If a variable x assumes values x1, x2, x3, ……, xn with respective probabilities p1, p2, p3, ….. , pn then it is called probability distribution provided …….

a) Pi ≥ 0 and sum of (Pi) < 1
b) 0 ≤ Pi ≤ 1 and sum of (Pi) > 1
c) Pi ≤ 1 and sum of (Pi) = 1
d) 0 ≤ Pi ≤ 1 and sum of (Pi) = 1

24 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

25 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

26 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

27 Given P(B) = 1/4, P(A∩B) = 1/6. Find P(A/B)

a) 1/3
b) 2/3
c) 1/6
d) ¼

28 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

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

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

30 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

31 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) 12, 3
b) 12, 2
c) 66, 220
d) 132, 220

32 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

33 Three newspapers A, B and C are published in a city and a survey reader indicate 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%

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 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

36 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

37 How many ways can the letters in the word COMPUTER be arranged if the letters CO must remain next to each other (in order) as a unit?

a) 8!
b) 9!
c) 7!
d) 10!

38 How many 5-permutations are there of a set of five objects?

a) 30
b) 60
c) 90
d) 120

39 Suppose the group of twelve consists of five men and seven women. How many five-person teams can be chosen that consist of three men and two women?

a) 100
b) 200
c) 210
d) 211

40 Consider various ways of ordering the letters in the word

MISSISSIPPI: IIMSSPISSIP, ISSSPMIIPIS, PIMISSSSIIP, and so on.

How many distinguishable orderings are there?

a) 34650
b) 34651
c) 34652
d) 34653

41 Suppose $P(A|B) = 1/2$ and $P(A \cap B) = 1/6$. What is $P(B)$?

a) 3
b) 1/6
c) ½
d) 1/3

42 A drawer contains ten black and ten white socks. You reach in and pull some out without looking at them. What is the least number of socks you must pull out to be sure to get a matched pair?

a) 1
b) 2
c) 3
d) 4

43 How many ways can the letters of the word QUICK be arranged in a row?

a) 5!
b) 6!
c) 7!
d) 8!

44 How many three-digit integers (integers from 100 to 999 inclusive) are divisible by 5?

a) 90
b) 120
c) 150
d) 180

45 Suppose that in a certain state, all automobile license plates have two letters followed by three digits. How many different license plates are possible?

a) 36*26*25*26
b) 26*26*10*10*10

c) 36*36*36*36*36
d) 3600000

46 An urn contains 5 blue and 7 Gray balls. Let us say that 2 are chosen at random, one after the other, without replacement. The probability that both balls are blue:

a) 20/132
b) 35/132
c) 42/132
d) 6/11

47 A coin is loaded so that the probability of heads is 0.6. Suppose the coin is tossed twice. What is the probability of obtaining two heads?

a) 6%
b) 16%
c) 26%
d) 36%

48 Suppose the council contains eight men and seven women. How many committees of six contain three men and three women?

a) $(8C3 \times 7C3)$
b) $(15C3 \times 7C3)$
c) $(8C3 \times 15C3)$
d) $(8C1 \times 7C1)$

49 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

50 Suppose a computer installation show 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