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TDC part – I Mathematics (Honours) paper-I (sample paper)

Set Theory

1. If $A \cap B^c = \emptyset$

   a. A=B b. $B \neq A$ c. A is proper subset of B d. None of these

2. $A^c - B^c$ is equal to

   a. B – A b. A – B c. A = B d. None of these

3. If A = ∅ then total number of element in P(A) are

   a. No element b. Zero c. Two d. One

4. A set has n elements , then the total number of proper subsets are

   a. 2^n b. 2^{n-1} c. 2^{2n} d. None of these

5. A set has n elements , then the total number of proper subsets are

   a. 2^n b. 2^{2n} c. 2^{2n-1} d. None of these

6. If aN = { ax, $x \epsilon N$ } Then the set 3N ∩7N is equal to

   a. 3N b. 7N c. 21N d. ∅

7. Which of the following sets are empty ?

   a. { x : x = x } b. { x : x ≠ x } c. { x : x = x^2 } d. { x : x ≠ x^2 }

8. If A and B are sets such that A U B = A ∩ B then

   a. A = ∅ b. B = ∅ c. A = B d. None

9. A – (B U C) is equal to

   a. (A – B) U (A – C) b. A – B – C c. (A – B) ∩ (A – C) d. (A – B) U C

10. The number of elements in the power set P(S) of the set : S = { { ∅ } ,1 , { 2, 3} } is

   a. 2 b. 0 c. 8 d. None

11. Let S be an infinite set and S_1 , S_2 , S_3 ....S_n be sets such that $S_1 \cup S_2 \cup S_3 \ldots\ldots \cup S_n = S$ then

   a. At least one of the sets S_i is a finite set.
   b. Not more than one of the set S_i can be infinite.
   c. At least one of the sets S_i is an infinite set .
   d. None of these.

12. The number of elements in the power set of the set { {a,b} ,c} is

a. 8 b. 4 c. 3 d. 7

13. Let n(A) denotes the number of the elements in set A . If n(A) = p and n(B) = q then how many ordered pairs(a, b) are there with a ϵ A and b ϵ B ?

a. P^2 b. p.q c. p + q d. 2pq

14. If A and B be sets and A^c , B^c denote the complements of the sets A and B then Set (A- B) U (B-A) U (A ∩ B) is equal to

a. A U B b. A^c U B^c c. A ∩ B d. A^c ∩ B^c

15. If A and B are sets then which of the following is FALSE ?

a. A – B′ = A ∩ B b. A ⊂ B => $B^c \subset A^c$ c. A – (A-B) = A ∩ B d. None of these

16. If A = { 1, 2 } B = { a , b } and C = { 1, a } then A X (B – C) =

a. { (1, a) , (2,a) } b. { (1, a) , (2 , b)} c. { (1, b) , (2 , b)} d. None of these

17. If A, B and C be there sets such that A = { a, b } , B = { c , d } and C = { e } then (AXB)∩ (AXC)

a. {{a,e},(c,e)} b. { (b,e),(d,e)} c. ∅ d.None

18. If X , Y , and Z be three sets then X U (Y X Z)

a. =(X U Y) x (X U Z) b. ≠ (X U Y) x (X U Z) c. = (X x Y) U (X x Z) d. None

19. If X and Y have n elements in common then number of common elements in X X Y and Y X X is

a. n b. 2n c. n^2 d. None

20. If X , Y and Z be three sets then

a. X x (Y x Z) = (X x Y) X Z b. X x (Y X Z) = (X x Y) U (X x Z) c. X x (Y x Z) ≠ (X x Y) x Z d. None

21. If X , Y and Z be three sets then

a. A U (Y x Z) = (X U Y) X (X U Z) b. X U (Y x Z) ≠ (X U Y) X (Y U Z) c. X U (Y x Z)=(X x Y) U (X x Z) d .None

22. If X and Y be any two sets then

a. $(X \times Y)^c = (X^c \times Y) \cup (X \times Y^c) \cup (X^c \times Y^c)$

b. . $(X \times Y)^c = (X^c \times Y) \cap (X \times Y^c) \cap (X^c \times Y^c)$

c. $X \times Y)^c = (X^c \times Y) \cup (X \times Y^c) \cap (X^c \times Y^c)$

d. None of these

23. If the ordered pair (x-2 ,2y +1) = (y-1 , x +2) then

a. x =2 y = 3 b. x = 1 y = 4 c. x = 3 y = 2 d. None of these

24. If A = { 1 , 2 } , B = {α} and C = { α , β } then (A – B) X C =

a. { (1 , α) , (1, β) ,(2, α), (α , β)}

b. { (1 , α) , (2 , α) ,(α , β) }

c. . { (1, β) ,(2, β), (1 , α)}

d. None of these

25. If (m – n , 2) = (m + 3 , 4m + 5) then

a. m = 3 n = ¾ b. m = - 3 n = - ¾ c. m = - ¾ n = -3 d. None of these

26. If n(X) = m and n(Y) = n then n(X X Y) =

a. m + n b. m.n c. m^n d. None of these

27. For all sets X and Y :-

a. $\overline{X \, X \, Y} = \bar{X}$ X Y b. $\overline{X \, X \, Y}$ = X X $\bar{Y}$ c. $\overline{X \, X \, Y} = \bar{X}$ X $\bar{Y}$ d. None of these

28. Let R is the Set of all triangles in a plane a R b if and only if a is congruent to b then R is

a. only reflexive b. only symmetric c. only transitive d. Equivalence relation

29. The relation "is parallel" on the set of all coplanar straight line is :

a. only reflexive b. only symmetric c. only transitive d. Equivalence relation

30. Let A = { a , b , c } and R = { (b , b) , (c , a) , (a , c) } then the relation R on A is

a. only reflexive b. only symmetric c. only transitive d. None of these

31. The relation " congruence module m " is

a. Equivalence relation b. only reflexive c. only symmetric c. only transitive

32. Let X is a finite set containing n distinct elements , then total number of relation on X are equal to

a. 2^n b. 2^{n-1} c. 2^{2n} d.2^{n2}

33. The number of relation that can be defined on the set A = { a , b , c } are

a. 2^9 b. 2^3 c. 9^2 d. 9

34. Let X & Y are two finite sets such that O(X) = m & O(Y) = n then the number of relations from X to Y are

a. 2^{m+n} b. m + n c. mn d. 2^{mn}

35. Consider the binary relation R = { (x , y),(x , z),(z , x),(z , y) } on the set { x ,y , z } , which one of the following is true

a. R is symmetric but Not antisymmetric b. R is not a symmetric but antisymmetric

c. R is both symmetric and antisymmetric d. R is neither symmetric nor antisymmetric

36. The set of all equivalence class of a set A of cardinality C

a. Has the same cardinality as A b. forms a partition of A

c. is of cardinality 2C d. is of cardinality C^2

37. The binary relation S = ø (empty set) on set A = { 1, 2,3} is

a. neither reflexive nor symmetric b. symmetric and reflexive

c. transitive and reflexive d. transitive and symmetric

38. “n/m”means that “n is a factors of m” then the relation T is

a. reflexive and symmetric b. transitive and symmetric

c. reflexive, symmetric and transitive d. reflexive, symmetric and not transitive

39. If R={(1,1),(3,1),(2,3),(4,2)} then which of the following represents R^2, where R^2 is R composition R ?

a. {(1,1)}, (3,1), (2,3), (4,2)} b. {(1,1), (9,1), (4,9), (16,41)}

c. {(1,3), (3,3), (3, 4), (3, 2)} d. {(1,1), (2, 1), (4, 3), (3,1)

40. Which of the following statements is false ?

a. R is reflexive , then $R \cap R^{-1} \neq \emptyset$ b. $R \cap R^{-1} \neq \emptyset => R\ is\ antisymmetric$

c. if R ,R^{-1} are equivalence relation in a set A, then $R \cap R^{-1}$ is also an equivalence relation in A

d. if R, R^{-1} are reflexive in A , then $R – R^{-1}$ is reflexive

41. Which of the following statements is true ?

a. Every equivalence relation is a partial ordering relation

b. Number of relations from A= { x, y, z } to B = { 1, 2) is 64

c. Empty relation ∅ is reflexive d. none

42. Let A = { 1, 2, 3, ……….} Define ~ by x ~ y ⇔ x divides y . then ~ is

a. Reflexive but not a partial ordering b. Symmetric

c. an Equivalence relation d. A partial ordering relation

43. The universal relation A x A on A is

a. An equivalence relation b. anti- symmetric

c. a partial ordering relation d. not symmetric and not ant- symmetric

44. A partition of { 1,2,3,4,5} is the family :

a. { (1,1) , (3, 4) , (3, 5) } b. { ∅ , (1 , 2) , (3 , 4) , (5) }

c. { (1, 2 , 3) , (5) } d. { (1 , 2) , (3 , 4 , 5) }

45. Let R be an equivalence relation on the set { 1 , 2 , 3 , 4 , 5 , 6 } given by { (1 , 1) , (1 , 5) , (2 , 2) , (2 , 3) , (2 , 6) , (3 , 2), (3 , 3), (3,6), (4,4), (5,1), (5,5), (6, 2), (6, 6) } The partition induced by R is

a.{ 1 ,2, 3 , 4 , 5 , 6 } b. { (1 , 3 , 5 , 6), (2, 4)} c. { (1 , 5) , (2, 3 , 6), (4)} d. { (1,2,3,4),(5,6)}

46. The relation R is define on the set of integers as x R y if (x +y) is even . Which of the following statements is true ?

a. R is not an equivalence relation

b. R is an equivalence relation having one equivalence class.

c. R is an equivalence relation having two equivalence class.

d. R is an equivalence relation having three equivalence class.

47. If R be a symmetric and transitive relation on set A then

a. R is reflexive and hence an equivalence relation .

b. R is reflexive and hence a partial order.

c. R is not a reflexive and hence not an equivalence relation

d. None of these.

48. If R is an equivalence relation on a set A then R^{-1} is

a. Reflexive b. Symmetric c. Transitive d. All of these

49. " Subset " relation on a set of sets is

a. A partial ordering b. An equivalence relation

c. transitive and Symmetric only d. Transitive and antisymmetric

50. The binary relation

R = { (1, 1), (2 , 1) , (2,2) , (2,3) ,(2,4) , (3,1) , (3,2) , (3,3) , (3,4)} on the set A = { 1,2,3,4} is

a. Reflexive , Symmetric and Transitive

b. Neither reflexive , nor irreflexive but transitive

c. Irreflexive , Symmetric and Transitive

d. Irreflexive and antisymmetric.

51. If a relation R is reflexive then

a. $R \cap R^{-1} = \emptyset$ b. $R \cap R^{-1} \neq \emptyset$ c. Both (a) and (b) d. None

52. If a relation R is symmetric then

a. $R \cap R^{-1} \neq \emptyset$ b. $R \cap R^{-1} = \emptyset$ c. Both (a) and (b) d. None

53. The domain and range are same for

a. Constant function b. Identity function c. Absolute value function d. Greatest integer function

54. Let Z denote the set of integer define $f : z \to z$

by $f(x) = x/2$, if x is even

x, if x is odd then f is

a. onto but not one-one b. one-one but not onto

c. one-one and onto d. neither one-one nor onto

55. To have inverse for the function f , f is

a. one-one b. onto c. one-one-onto d. identity function

56. If f : R → R is define by $f(x) = x^2 + 1$, then the value of $f^{-1}(17)$ and $f^{-1}(3)$ are respectively

a. {∅} , (4 , -4) b. (3 , -3) , { ∅} c. {∅} , { 3 , -3} d. { 4, -4 } , ∅

57. If : A → B is a bijection function , then $f^{-1} o f$ =

a. $f o f^{-1}$ b. f c. f^{-1} d. I_A

58. let f :R → R be define by

$$f(x) = \begin{cases} x + 2, & x \leq -1 \\ x^2, & -1 < x \leq 1 \\ 2 - x, & x > 1 \end{cases}$$

Then the value of f(-1.75) + f(0.5) + f(1.5) is

a. 0 b. 2 c. 1 d. -1

59. The function f : N → N defined by f(x) = 2x + 1 is

a. Surjection b. Not Surjection c. Injection d. none of these

60. If a set has n elements then number of functions that can be defined from A into A is

a. n^2 b. n! c. n^n d. n

61. If f : z → z be define as $f(x) = x^2$, x ∈ z , then function f is

a. Bijection b. Injection c. Surjection d. None of these

62. If f(x) and g(x) are defined on domains A and B respectively then domain of f(x) + g(x) is

a. A U B b. A ∩ B c. A Δ B d. A – B

63. If function f : R → R is given by $f(x) = x^2 + 2x - 3$ and function g : R → R is given by g(x) = 3x – 4 then (g o f) (x) is

a. $9x^2 + 18x + 5$ b. $3x^2 + 6x - 13$ c. $x^2 + x - 7$ d. $x^2 - 5x - 1$

64. If f : X → Y be a mapping and A,B are subsets of Y then f^{-1} (Y – A) =

a. $Y - f^{-1}(A)$ b. $X - f^{-1}(A)$ c. $X - f^{-1}(B)$ d. None

65. If f : X → Y be a mapping and A,B are subsets of Y then f^{-1} (Y – B) =

a. $X - f^{-1}(B)$ b. $Y - f^{-1}(B)$ c. $X - f^{-1}(A)$ d. None

66. If f and g are two function from R to R defined as : f(x) = x + 2 and $g(x) = \frac{1}{x^2+1}$ then $(f^{-1} o g)$ (x) =

a. $\frac{2x^2-1}{x^2+1}$ b. $\frac{2x^2-1}{x^2-1}$ c. $\frac{-2x^2-1}{x^2+1}$ d. None

67. If f : Q → Q defined by f(x) = 2x + 3 , ∀ $x \in Q$ and is one – one – onto then f^{-1} =

a. $\frac{y+3}{2}$ b. $\frac{-y+3}{2}$ c. $\frac{y-3}{2}$ d. None

68. Two sets A and B are said to be equivalence if :

a. A ⊆ B and B ⊆ A b. There exists one-one into function f : A → B

c. There exists one-one onto mapping f : A → B d. None of these

69. Numerically equivalence of sets is

a. reflexive only b. reflexive and symmetric both

c. reflexive , symmetric and transitive d. reflexive and symmetric but not transitive

70. If a finite set of elements is added to an enumerable set , the resulting set is

a. enumerable b. not enumerable c. both (a) and (b) d. None

71. If we subtract an enumerable set from a non-enumerable set then the remaining set is

a. enumerable b. not enumerable c. both (a) and (b) d. None

72. The unit interval [0, 1] is

a. Countable b. not Countable c. both (a) and (b) d. None

73. If set A is countable , then A is

a. finite b. Denumerable c. either finite or denumerable d. None

74. A X B is countable if

a. A is countable b. B is countable c. A and B both are countable d. None

75. A set A is infinite then

a. A is equal to N (Set of natural number) b. A is equivalent to N

c. A is not equivalent to N d. None

Matrix

76. If A is an m x n matrix such that A . B and B . A are both defined , then B is

a. m x n matrix b. n x m matrix c. n x n matrix d. m x m matrix

77. If A is a matrix of m x n order and B is a matrix such that AB′ and B′A are both defined , then the order of matrix B is

a. m x m matrix b. n x n matrix c. n x m matrix d. m x n matrix

78. The matrix $\begin{pmatrix} 0 & -5 & 8 \\ 5 & 0 & 12 \\ -8 & -12 & 0 \end{pmatrix}$ is a

a. Diagonal matrix b. Symmetric matrix

c. Skew Symmetric matrix d. Scalar matrix

79. The order of the single matrix obtained from

$\begin{pmatrix} 1 & -1 \\ 0 & 2 \\ 2 & 3 \end{pmatrix} \left\{ \begin{pmatrix} -1 & 0 & 2 \\ 2 & 0 & 1 \end{pmatrix} - \begin{pmatrix} 0 & 1 & 23 \\ 1 & 0 & 21 \end{pmatrix} \right\}$ is

a. 2 x 3 b. 2 x 2 c. 3 x 2 d. 3 x 3

80. If $\begin{pmatrix} x+y & 2x+z \\ x-y & 2z+w \end{pmatrix} = \begin{pmatrix} 4 & 7 \\ 0 & 10 \end{pmatrix}$ then the value of x , y, z and w respectively are

a. 2,2,3,4 b. 2,3,1,2 c. 3,3,0,1 d. None of these

81. The matrix $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ is a

a. unit matrix b. symmetric matrix c. Skew symmetric matrix d. Diagonal matrix

82. If A = $(a_{ij})_{4 \times 3}$ where $a_{ij} = \frac{i-j}{i+j}$, then A =

a. $\begin{pmatrix} 0 & -1/3 & -1/2 \\ 1/2 & 0 & 1/5 \\ 1/3 & 1/5 & 0 \\ 3/5 & 1/3 & 1/7 \end{pmatrix}$ b. $\begin{pmatrix} 0 & -1/3 & -1/2 \\ 1/3 & 0 & -1/5 \\ 1/2 & 1/5 & 0 \\ 3/5 & 1/3 & 1/7 \end{pmatrix}$

c. $\begin{pmatrix} 0 & -3 & -1/2 \\ 2 & 0 & 5 \\ 3 & 5 & 0 \\ 3/5 & 3 & 7 \end{pmatrix}$ d. $\begin{pmatrix} 0 & 1/3 & 1/2 \\ -1/3 & 0 & 1/5 \\ -1/2 & -1/5 & 0 \\ -3/5 & -1/3 & -1/7 \end{pmatrix}$

83. The matrix $\begin{pmatrix} 0 & 5 & -7 \\ -5 & 0 & 11 \\ 7 & -11 & 0 \end{pmatrix}$ is

a. A skew symmetric matrix b. A symmetric matrix c. A diagonal matrix d. an upper triangular matrix

84. If a matrix A = $\begin{pmatrix} 5 & 2 & x \\ y & 2 & -3 \\ 4 & t & -7 \end{pmatrix}$ is a symmetric matrix , then the value of x , y and t are respectively.

a. 4 , 2 , 3 b. 4 , 2, -3 c. 4 , 2 , -7 d. 2 , 4 , -7

85. for any square matrix A , A.A^T is a

a. Unit matrix b. symmetric matrix c. skew symmetric matrix d. diagonal matrix

86. If A = $\begin{pmatrix} 0 & -1 & 2 \\ 1 & 0 & 3 \\ -2 & -3 & 0 \end{pmatrix}$ then A + 2 A^T =

a. A b. –A^T c. A^T d. $2A^2$

87. If A = $\begin{pmatrix} cosx & -sinx \\ sinx & cosx \end{pmatrix}$ then A . A^T =

a. zero matrix b. I_2 c. $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$ d. None of these

88. If A is any square matrix , then which of the following is skew symmetric ?

a. A + A^T b. A - A^T c. A . A^T d. A^T . A

89. If A is a square matrix , then A - A' is a

a. Diagonal matrix b. Skew symmetric matrix c. Symmetric matrix d. None of these

90. If A = $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, then A^2 - 5A is equal to

a. 2I b. 3I c. -2I d. Null matrix

91. If A = $\begin{pmatrix} a & b \\ b & a \end{pmatrix}$ and A^2 = $\begin{pmatrix} \alpha & \beta \\ \beta & \alpha \end{pmatrix}$ then

a. $\alpha = a^2 + b^2 , \beta = a.b$ b. $\alpha = a^2 + b^2 , \beta = 2a.b$

c. $\alpha = a^2 + b^2 , \beta = a^2 - b^2$ d. None of these

92. If A = $\begin{pmatrix} 3 & x-1 \\ 2x+3 & x+2 \end{pmatrix}$ is a symmetric matrix , then x =

a. 4 b. 3 c. -4 d. -3

93. If A = $\begin{pmatrix} 1 & 2 & x \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$, B = $\begin{pmatrix} 1 & -2 & y \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ and A . B = I_3 then x + y =

a. 0 b. -1 c. 2 d. None of these

94. If A = $\begin{pmatrix} 1 & 3 \\ 3 & 4 \end{pmatrix}$ and A^2 - KA – 5I = 0 then K =

a. 5 b. 3 c. 7 d. None of these

95. If A = $\begin{pmatrix} 1 & -2 & 1 \\ 2 & 1 & 3 \end{pmatrix}$ and B = $\begin{pmatrix} 2 & 1 \\ 3 & 2 \\ 1 & 1 \end{pmatrix}$ then (A . B) ^{T} =

a. $\begin{pmatrix} -3 & -2 \\ 10 & 7 \end{pmatrix}$ b. $\begin{pmatrix} -3 & 10 \\ -2 & 7 \end{pmatrix}$ c. $\begin{pmatrix} -3 & 7 \\ 10 & 2 \end{pmatrix}$ d. None of these

96. If A = $\begin{pmatrix} 1 & 2 \\ -5 & 1 \end{pmatrix}$ and A^{-1} = x . A + y I then the value of x and y are respectively.

a. $\frac{-1}{11}, \frac{2}{11}$ b. $\frac{-1}{11}, \frac{-2}{11}$ c. $\frac{1}{11}, \frac{2}{11}$ d. $\frac{1}{11}, \frac{-2}{11}$

97. If A = $\begin{pmatrix} 2x & 0 \\ x & x \end{pmatrix}$ and A^{-1} = $\begin{pmatrix} 1 & 0 \\ -1 & 2 \end{pmatrix}$ then x =

a. 2 b. -1/2 c. 1 d. ½

98. If A = $\begin{pmatrix} 1 & 2 & 3 \\ 3 & 4 & 5 \\ 5 & 6 & 7 \end{pmatrix}$ is the sum of a symmetric matrix B and a skew symmetric matrix C , then B is

a. $\begin{pmatrix} 1 & \frac{5}{2} & 4 \\ \frac{5}{2} & 4 & \frac{11}{2} \\ 4 & \frac{11}{2} & 7 \end{pmatrix}$ b. $\begin{pmatrix} 0 & \frac{5}{2} & -4 \\ \frac{5}{2} & 0 & \frac{11}{2} \\ -4 & \frac{11}{2} & 0 \end{pmatrix}$ c. $\begin{pmatrix} 1 & -\frac{5}{2} & 4 \\ -\frac{5}{2} & 4 & \frac{11}{2} \\ 4 & \frac{11}{2} & 3 \end{pmatrix}$ d. None

99. If A = $\begin{pmatrix} 1 & \alpha & 1 \\ \beta & 1 & 1 \\ 1 & 1 & \gamma \end{pmatrix}$ is the sum of a symmetric matrix B and a skew symmetric matrix C , then C is

a. $\begin{pmatrix} 0 & \frac{\alpha-\beta}{2} & \frac{\alpha+\beta}{2} \\ \frac{-(\alpha-\beta)}{2} & 0 & 1 \\ -\frac{\alpha+\beta}{2} & -1 & 0 \end{pmatrix}$ b. $\begin{pmatrix} 0 & \frac{\alpha-\beta}{2} & \frac{-(\alpha+\beta)}{2} \\ \frac{-(\alpha-\beta)}{2} & 0 & \frac{\alpha+\beta}{2} \\ \frac{\alpha+\beta}{2} & -\frac{\alpha+\beta}{2} & 0 \end{pmatrix}$ c. $\begin{pmatrix} 0 & \frac{\alpha-\beta}{2} & 0 \\ -\frac{(\alpha-\beta)}{2} & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$ d. None

100. If a matrix A is both symmetric and skew symmetric then

a. A is a diagonal matrix b. A is a zero matrix

c. A is a scalar matrix d. A is a square matrix

101. If $\begin{pmatrix} x+3 & z+4 & 2y-7 \\ 2x+6 & a-1 & 0 \\ b-3 & 3b & z+2c \end{pmatrix}$ = $\begin{pmatrix} 0 & 6 & 3y-2 \\ 2x & -3 & 2c+2 \\ 2b+y & -21 & 0 \end{pmatrix}$

Then the value of a, b, c, x, y, z are respectively:

a. -2, -7, -1, -3 ,-5 , -2 b. 2, 7, 1, 3, 5, 2

c. 1, 3, 4, 2, 8, 9 d. -2 , -7 , -1 , -3 , -5 , 2

102. Total number of possible matrices of order 3 x 3 with each entry 2 or 0 is :

a. 9 b. 27 c. 81 d. 512

103. If A and B are matrices of same order , then ($AB^1 - BA^1$) is a

a. null matrix b. symmetric matrix

c. skew symmetric matrix d. unit matrix

104. If A = $\begin{pmatrix} 2 & 1 \\ -1 & 2 \end{pmatrix}$, B = $\begin{pmatrix} 1 & -2 \\ 2 & 1 \end{pmatrix}$, C = $\begin{bmatrix} 1 & -3 \\ 2 & 1 \end{bmatrix}$ then

a. A+B = B+A and A+ (B + C) = (A + B) + C b. A + B = B + A and A.C =B.C

c. A + B = B + A and A . B = B . C d. A C = B C and A =B C

105. If A and B are symmetric matrices of the same order, then

a. A.B is symmetric b. A – B is symmetric

c. AB + BA is symmetric d. AB – BA is symmetric

106. inverse of the matrix $\begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 3 \\ 1 & 1 & 2 \end{pmatrix}$ is

a. $\begin{pmatrix} 1/4 & 3/4 & -1 \\ -3/4 & 1/4 & 0 \\ -1/4 & -1/4 & 1 \end{pmatrix}$ b. $\begin{pmatrix} -1/4 & -3/4 & 1 \\ 3/4 & 1/4 & 0 \\ 1/4 & 1/4 & 1 \end{pmatrix}$ c. $\begin{pmatrix} -1/4 & 3/4 & -1 \\ 3/4 & -1/4 & 0 \\ -1/4 & -1/4 & 1 \end{pmatrix}$ d. None

107. Inverse of the matrix $\begin{pmatrix} 2 & -1 & 3 \\ 1 & 1 & 1 \\ 1 & -1 & 1 \end{pmatrix}$ is

a. $\begin{pmatrix} -1 & 1 & -2 \\ 0 & 1/2 & -1/2 \\ 1 & 1/2 & -3/2 \end{pmatrix}$ b. $\begin{pmatrix} -1 & 1 & 2 \\ 0 & 1/2 & -1/2 \\ 1 & -1/2 & -3/2 \end{pmatrix}$

c. $\begin{pmatrix} 1 & -1 & 2 \\ 0 & -1/2 & 1/2 \\ 0 & -1/2 & 3/2 \end{pmatrix}$ d. None

108. If A = $\begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, B = $\begin{bmatrix} x & 1 \\ y & -1 \end{bmatrix}$ and $(A + B)^2 = A^2 + B^2$, then X + Y =

a. 2 b. 3 c. 4 d. 5

109. If $A^2 - A + I = 0$, then inverse of A is

a. I – A b. A – I c. A d. A + I

110. If A is a square matrix such that $A^2 = I$, then $(A - I)^3 + (A + I)^3 - 7A$ =

a. A b. I – A c. I + A d. 3A

111. Rank of the matrix $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 7 & 8 & 10 \end{pmatrix}$ is

a. 3 b. 2 c. 1 d. None of these

112. Rank of the matrix $\begin{pmatrix} 1 & 1 & -1 & 1 \\ 1 & -1 & 2 & -1 \\ 3 & 1 & 0 & 1 \end{pmatrix}$ is

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

113. Rank of the matrix $\begin{pmatrix} t & 1 & 0 \\ 0 & t & 0 \\ 0 & 0 & t+3 \end{pmatrix}$ for all values of t is

a. 2 b. 3 c. 2 when t = 2 or -3 and 3 otherwise d. None of these

114. If points (x_1 , y_1) , (x_2 , y_2) and (x_3 , y_3) are collinear then rank of the matrix $\begin{pmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{pmatrix}$ is

a. greater than 2 b. greater than 3 c. less than 3 d. none

115. If a ≠ b≠ c , than rank of the matrix $\begin{pmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{pmatrix}$ is

a. 1 b. 2 c. 3 d. none

116. Rank of the matrix $\begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}$ is

a. 1 b. 2 c. 3 d. none

117. If M is a row matrix of order 1 x n and N is a column matrix of order n x 1 then rank of M.N is

a. 1 b. n c. n-1 d. n^2

118. Let M be a non – singular matrix of order " 3 " and N be a non – zero singular matrix of order "3" in which Every minor of order "2" is zero , then rank of M N is,

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

119. If M is a non-singular matrix of order n and N is an n x p matrix of rank r, then rank of AB is

a. n b. p c. r d. r – 1

120. If M is a square matrix of order "4" with rank "2" and N is a square matrix of order 4 with rank 4 then rank of MN is

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

121. Equivalence of matrices is

a. reflexive but not symmetric b. symmetric but not transitive

c. Transitive but not reflexive d. Reflexive , symmetric and transitive

122. The rank of m x n matrix whose elements are unity is

a. m b. n c. m.n d. 1

123. If A is complex matrix then

a. $\rho(A) < \rho(\bar{A})$ b. . $\rho(A) > \rho(\bar{A})$ c. . $\rho(A) = \rho(\bar{A})$ d. None of these

124. . If A is complex matrix then

a. $\rho(A) < \rho(A^*)$ b. $\rho(A) > \rho(A^*)$ c. $\rho(A) = \rho(A^*)$ d. None of these

125. Rank of non-singular matrix of order n is

a. n b. n – 1 c. n^2 d. None of these

126. If the equations x + ay – z =0 , 2x – y + az = 0 and ax + y + 2z = 0 are consistent , then a is equal to

a. 2 , 3 b. -2 , 3 c. $2 \pm\sqrt{3}$, -2 d. . $1 \pm\sqrt{3}$, -2

127. Given 2x – y +2z = 2 , x – 2y +z = -4 , x + y + λ.z = 4 then the value of λ such that the given system of equations has no solution is

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

128. If the system of linear equation x + 2ay +az = 0 , x + 3by + bz = 0 , x + 4cy + cz =0 has a non-zero solution then a , b , c

a. Are in A.P b. Are in G.P. c. Are in H.P d. satisfy a + 2b + 3c = 0

129. for what value of k the following system of linear equation will have infinite solution :

x– y + z = 3 , 2x + y – z = 2 and -3x -2ky +6z = 3

a. k $\neq$ 2 b. k = 0 c. k = 3 d. k $\epsilon[2 , 3]$

130. The system of linear equations x + y + z = 2 , 2x + y – z = 3 and 3x + 2y +kz =4 has a unique solution If k is not equal to

a. 4 b. -4 c. 0 d. 3

131. The system of equation 2x – y + z = 0 , x – 2y + z = 0 , and λ.x – y +2z =0 has infinite number of non-trivial solution for:

a. $\lambda = 1$ b. λ = 5 c. λ = -5 d. no real value of λ

132. If The system of equations x + ay = 0 , az + y = 0 and ax + z = 0 has infinite solutions , then the value of "a" is

a. -1 b. 1 c. 0 d. no real value

133. If ω is a cube root of unity and x + y + z = a , x + ω y + ω^2 z = b and x + ω^2y + ωz = c then (x, y, z) =

a. x = (a + b + c)/3 , y = (a + b ω + c ω^2)/3 , z = (a + b ω^2 + c ω)/3

b. . x = (a + b + c)/3, y = (a + b ω^2 + c ω)/3 , z = (a + b ω + c ω^2)/3

c. . x = (a + b ω^2 + c ω)/3 , y = (a + b ω + c ω^2)/3 , z = (a + b + c)/3

d. None of these

134. The product of two orthogonal matrices is

a. orthogonal b. Involutory c. Unitary d. Idempotent

135. if A =$\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$ $then$ adj.A is

a. $\begin{bmatrix} 7 & -3 \\ -5 & 3 \end{bmatrix}$ b. $\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$ c. $\begin{bmatrix} -7 & 3 \\ 5 & 2 \end{bmatrix}$ d. $\begin{bmatrix} -7 & 3 \\ 5 & -2 \end{bmatrix}$

Trigonometry

136. If z = x + iy , then imaginary part of z is

a. $\frac{z+\bar{z}}{2}$ b. .$\frac{z-\bar{z}}{2}$ c. z. $\bar{z}$ d. None

137. The value of i^{100} is

a. 1 b. -1 c. i d. –i

138. n the roots of unity form a

a. Arithmetic Progression b. Geometric Progression c. Harmonic progression d. None

139. Sum of nth roots of unity (n $\neq$ 1) is

a. 0 b. 1 c. n d. None

140. If x = $\cos\theta$ + i$\sin\theta$, then the value of x^{100} + $\frac{1}{x^{100}}$ is

a. -2$\cos 100\theta$ b. 2$\cos 100\theta$ c. $\cos\theta$ d. None

141. If Z = - 1 – i , then polar form of Z is

a. $\sqrt{2}$ (cos$\frac{\pi}{4}$ + isin$\frac{\pi}{4}$) b. $\sqrt{2}$ (cos$\frac{\pi}{4}$ - i sin$\frac{\pi}{4}$) c. 2 (cos$\frac{\pi}{4}$ + isin$\frac{\pi}{4}$) d. None

142. Solution of the equation x^7 – 1 = 0 are

a. cos$\frac{n\pi}{7}$ + isin$\frac{n\pi}{7}$ b. cos$\frac{n\pi}{7}$ - isin$\frac{n\pi}{7}$ c. cos$\frac{2n\pi}{7}$ + isin$\frac{2n\pi}{7}$ d. None

143. If x = $\cos\alpha$ + i$\sin\alpha$, y = $\cos\beta$ + i$\sin\beta$, z = $\cos\gamma$ + i$\sin\gamma$ and x + y + z = 0 then 1/x + 1/y +1/z =

a. 1 b. -1 c. 0 d. None

144. If a = $\frac{1}{\sqrt{2}}$ + i$\frac{1}{\sqrt{2}}$, then value of a^5 + conjugate of a^5 =

a. cos$\frac{3\pi}{4}$ b. cos$\frac{5\pi}{4}$ c. 2sin$\frac{5\pi}{4}$ d. 2cos$\frac{5\pi}{4}$

145. Value of (1 + i) ^{100} is

a. 2^{100}($\cos 100\pi$ + i$\sin 100\pi$) b. 2^{100}($\cos 25\pi$ + i$\sin 25\pi$)

c. . 2^{50}($\cos 100\pi$ + i$\sin 100\pi$) d. . 2^{50}($\cos 25\pi$ + i$\sin 25\pi$)

146. If n is a positive integer , then $\cos^n\theta =$

a. $\cos n\theta$ + n $\cos(n-1)\theta$ + $\frac{n(n-1)}{2!}\cos(n-2)\theta$ + ...

b. $\cos n\theta$ + n $\cos(n-2)\theta + \frac{n(n-1)}{2!}\cos(n-4)\theta + \ldots\ldots\ldots$

c. $\frac{1}{2^n}[\cos n\theta$ + n $\cos(n-1)\theta + \frac{n(n-1)}{2!}\cos(n-2)\theta + \ldots\ldots\ldots]$

d. . $\frac{1}{2^{n-1}}[\cos n\theta$ + n $\cos(n-2)\theta + \frac{n(n-1)}{2!}\cos(n-4)\theta + \ldots\ldots\ldots]$

147. If n is a possible odd integer , then $(2 i\sin\theta)^n$ =

a. . $\sin n\theta$ - n $\sin(n-1)\theta + \frac{n(n-1)}{2!}\sin(n-2)\theta + \ldots\ldots\ldots$

b. . $\sin n\theta$ - n $\sin(n-2)\theta + \frac{n(n-1)}{2!}\sin(n-4)\theta + \ldots\ldots\ldots$

c. . $\cos n\theta$ - 2 n $\cos(n-2)\theta + \frac{n(n-1)}{2!}2\cos(n-4)\theta + \ldots\ldots\ldots$

d. None of these

148. If $\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}$ = 3 then $\sin^4\theta$ =

a. 16/25 b. 2/5 c. 1/5 d. 3/5

149. $\cot\frac{1}{2}\theta - \cot\theta$ =

a. $\cot\theta$ b. $\sec\theta$ c. cosc θ d. None

150. $\cot\theta - 2\cot 2\theta$ =

a. $\tan 2\theta$ b. $\tan\theta$ c. $\cot\theta$ d. None

151. Cube roots of -1 are :

a. -1 , $\frac{1}{2}$ (-1 $\pm i\sqrt{3}$) b. . 1 , $\frac{1}{2}$ (1 $\pm i\sqrt{3}$) c. . -1 , $\frac{1}{2}$ (1 $\pm i\sqrt{3}$) d. . -1 , -1 , 1

152. Product of nth roots of unity is

a. $(-1)^n$ b. $(-1)^{n-1}$ c. $(-1)^{2n-1}$ d. None

153. fourth roots of unity are:

a. $\pm 1 , \pm i$ b. 0 , 1 , ω , ω^2 c. ± 1 , ± 2 d. None of these

154. If (a + ib) (c + id) (e + if) (g +ih) = A + iB

Then $(a^2 + b^2)(c^2 + d^2)(e^2 + f^2)(g^2 + h^2)$ =

a. $A^2 - B^2$ b. $A^2 + B^2$ c. $A^4 + B^4$ d. $A^4 - B^4$

155. $\frac{(\cos\theta + i\sin\theta)^4}{(\cos\theta + i\sin\theta)^5}$ =

a. $\cos\theta - i\sin\theta$ b. . $\cos 9\theta - i\sin 9\theta$ c. $\sin\theta$ - i$\cos\theta$ d. . $\sin 9\theta$ - i$\cos 9\theta$

156. –i =

a. $e^{\frac{i\pi}{2}}$ b. $e^{\frac{-i\pi}{2}}$ c. $e^{\frac{\pi}{2}}$ d. None of these

157. Principal value of Log i =

a. $\frac{1}{2}(4n + 1)\,\pi$ b. $\frac{1}{2}(4n + 1)\,i$ c. $\frac{1}{2}(4n + 1)\,\pi i$ d. None of these

158. If a and x are both complex numbers and a $\neq$ 0 , then a^x =

a. e^{xloga} b. $e^{xloga}.\,e^{2n\pi i}$ c. $e^{xloga}.\,e^{2n\pi xi}$ d. None of these

159. General value of i^i =

a. $e^{\frac{-(4n+1)\pi}{2}}$ b. $e^{\frac{(4n+1)\pi}{2}}$ c. $e^{(4n+1)\pi}$ d. None of these

160. $\sin^{-1} i$ =

a. $2n\pi - i\log(\sqrt{2} - 1)$ b. $2n\pi + i\log(\sqrt{2} - 1)$

c. $2n\pi - i\log(\sqrt{2} + 1)$ d. $2n\pi + i\log(\sqrt{2} + 1)$

161. $(1 + i)^{1/7}$ =

a. $2^{1/7}(\cos\frac{1}{7}\left(2n + \frac{1}{4}\right)\pi + i\sin\frac{1}{7}\left(2n + \frac{1}{4}\right)\pi)$ b. $2^{1/7}(\cos\frac{1}{7}\left(2n + \frac{1}{4}\right)\pi - i\sin\frac{1}{7}\left(2n + \frac{1}{4}\right)\pi)$

c. $2^{1/14}(\cos\frac{1}{7}\left(2n + \frac{1}{4}\right)\pi + i\sin\frac{1}{7}\left(2n + \frac{1}{4}\right)\pi)$ d. None of these

162. Euler's formula is

a. $e^{i\theta} = \sin\theta + i\cos\theta$ b. $e^{\theta} = \cos\theta + i\sin\theta$ c. $e^{i\theta} = \cos\theta + i\sin\theta$ d. $e^{\theta} = \sin\theta + i\cos\theta$

163. The real part of exp. ($e^{i\theta}$) is

a. $e^{cos\theta}.\cos(sin\theta)$ b. $e^{cos\theta}.\cos(cos\theta)$ c. $e^{cos\theta}.\sin(cos\theta)$ d. $e^{cos\theta}.\sin(sin\theta)$

164. If A. $e^{2i\theta}$ + B. $e^{-2i\theta}$ = $5\cos 2\theta - 7i\sin 2\theta$, then

a. A = 5 , B = -7 b. A = -5 , B = 7 c. A = 1 , B = -6 d. A = - 1 , B = 6

165. If Z = x + iy , then the modulus and amplitude of e^{Z^2} are:

a. $e^{x^2+y^2}$, $i2xy$ b. $e^{x^2+y^2}$, $2xy$ c. $e^{x^2-y^2}$, $i2xy$ d. $e^{x^2-y^2}$, $2xy$

166. The value of $e^{\theta+\pi i}$ is equal to

a. $e^{-\theta}$ b. $-e^{\theta}$ c. e^{θ} d. $-e^{-\theta}$

167. The value of $\tan\theta$ is

a. $\frac{e^{i\theta}+e^{-i\theta}}{2}$ b. . $\frac{e^{i\theta}+e^{-i\theta}}{2i}$ c. $\frac{e^{i\theta}-e^{-i\theta}}{i(e^{i\theta}+e^{-i\theta})}$ d. . $\frac{i(e^{i\theta}+e^{-i\theta})}{(e^{i\theta}-e^{-i\theta})}$

168. General value of $\sin^{-1}(u + iv)$ is :

a. $n\pi + \sin^{-1}(u + iv)$ b. $2n\pi \pm \sin^{-1}(u + iv)$ c. $n\pi + (-1)^n \sin^{-1}(u + iv)$ d. None

169. The real part of $\sin^{-1}(\cos\theta + i\sin\theta)$ *is*

a. $\cos^{-1}\sqrt{\sin\theta}$ b. *log*$(\sqrt{\sin\theta} + \sqrt{1 + \sin\theta})$ c. $\sin^{-1}\sqrt{\sin\theta}$ d. *log*$(\sqrt{\cos\theta} + \sqrt{1 + \cos\theta})$

170. If Z = r. $e^{i\theta}$ then *logZ =*

a. log r b. log r + θ c. log r + θi d. None of these

171. log($\pm i$) is equal to

a. $\pm i$ b. $\pm\frac{i\pi}{2}$ c. $\pm i\pi$ d. $\pm 2i\pi$

172. General value of $\cos^{-1}(u+iv)$ is :

a. $2n\pi$ + $\cos^{-1}(u+iv)$ b.2 $n\pi$ - $\cos^{-1}(u+iv)$

c. $2n\pi \pm \cos^{-1}(u+iv)$ d. None of these

173. . General value of $\tan^{-1}(u+iv)$ is :

a. $n\pi$ + $\tan^{-1}(u+iv)$ b.2 $n\pi$ + $\tan^{-1}(u+iv)$

c. $n\pi -$ $\tan^{-1}(u+iv)$ d.2 $n\pi$ - $\tan^{-1}(u+iv)$

174. The value of log(1 + $e^{i\theta}$) is

a. log (2sin$\frac{\theta}{2}$) + $\frac{i\theta}{2}$ b. log (2sin$\frac{\theta}{2}$) - $\frac{i\theta}{2}$

c. log (2oss$\frac{\theta}{2}$) + $\frac{i\theta}{2}$ d. $\frac{i\theta}{2}$

175. value of log(*xi) is*

a. log x + iπ b. log x - iπ c. - log x + iπ d. - log x - iπ

176. 1 - $\frac{1}{3.3}$ + $\frac{1}{5.3^2}$ - $\frac{1}{7.3^3}$ + …………………to ∞ =

a. $\frac{\sqrt{3}}{2}$ b. $\frac{\sqrt{3}\ \pi}{2}$ c. $\frac{\sqrt{3}}{6}$ d. $\frac{\sqrt{3}\ \pi}{6}$

177. $\frac{\pi}{8}$ =

a. $\frac{1}{1.3}$ - $\frac{1}{5.7}$ + $\frac{1}{9.11}$ - …………………to ∞ b. $\frac{1}{2.4}$ - $\frac{1}{6.8}$ + $\frac{1}{10.12}$ - …………………to ∞

c. $\frac{1}{2.4}$ + $\frac{1}{6.8}$ + $\frac{1}{10.12}$ + …………………to ∞ d. $\frac{1}{1.3}$ + $\frac{1}{5.7}$ + $\frac{1}{9.11}$ + …………………to ∞

178. 1 - $\frac{\pi}{8}$ =

a. $\frac{1}{3.5}$ + $\frac{1}{7.9}$ + $\frac{1}{11.13}$ +…………………to ∞ b. $\frac{1}{3.5}$ - $\frac{1}{7.9}$ + $\frac{1}{11.13}$ - …………………to ∞

c. $\frac{1}{2.4}$ + $\frac{1}{6.8}$ + $\frac{1}{10.12}$ + …………………to ∞ d.None

179. If $-1 \le$ x ≤ 1 then $\tan^{-1}$x =

a. x + $\frac{x^3}{3}$ + $\frac{x^5}{5}$ $+ \cdots$ …. b. x - $\frac{x^3}{3}$ + $\frac{x^5}{5}$ $- \cdots$ ….

c. x - $\frac{x^3}{3!}$ + $\frac{x^5}{5!}$ $- \cdots$ …. d.none of these

180. If $-\frac{\pi}{4} \le \theta \le \frac{\pi}{4}$ then $\theta =$

a. $\tan\theta$ $-\frac{1}{3}$ $(\tan\theta)^3$ $+\frac{1}{5}$ $(\tan\theta)^5 - \cdots$ b. $\tan\theta$ $+\frac{1}{3}$ $(\tan\theta)^3$ $+\frac{1}{5}$ $(\tan\theta)^5 + \cdots$

c. $\tan\theta \; -\frac{1}{3!}\;(\tan\theta)^3 \;\; +\frac{1}{5!}\;(\tan\theta)^5 - \cdots$ d. None

181. $\frac{1}{2^3} - \frac{1}{3.2^7} + \frac{1}{5.2^{11}} - \cdots \dots \dots .to \; \infty$ =

a. $\frac{1}{2}\tan^{-1}\frac{1}{2}$ b. $\frac{1}{2}\tan^{-1}\frac{1}{3}$ c. $\frac{1}{2}\tan^{-1}\frac{1}{4}$ d. None

182. The value of $\frac{tan^2\theta}{2} - \frac{tan^4\theta}{4} + \frac{tan^6\theta}{6}$ .... is

a. $\sec\theta$ b. log$\cos\theta$ c. log$\sec\theta$ d. $\cos\theta$

183. The value of (1 - $\frac{1}{3^{\frac{1}{2}}}$) - $\frac{1}{3}$(1 - $\frac{1}{3^{\frac{3}{2}}}$) + $\frac{1}{5}$ (1 - $\frac{1}{3^{\frac{5}{2}}}$) ....to ∞ is

a. $\frac{\pi}{4}$ b. $\frac{\pi}{6}$ c. $\frac{\pi}{12}$ d. None of these

184. ($\frac{2}{3}$ + $\frac{1}{7}$) - $\frac{1}{3}$($\frac{2}{3^2}$ + $\frac{1}{7^3}$) + $\frac{1}{5}$($\frac{2}{3^5}$ + $\frac{1}{7^5}$) - .... To ∞ is

a. $\frac{\pi}{2}$ b. $\frac{\pi}{8}$ c. $\frac{\pi}{6}$ d. $\frac{\pi}{4}$

185. . ($\frac{1}{2}$ + $\frac{1}{3}$) - $\frac{1}{3}$($\frac{1}{2^3}$ + $\frac{1}{3^3}$) + $\frac{1}{5}$($\frac{1}{2^5}$ + $\frac{1}{3^5}$) - .... To ∞ is

a. $\frac{\pi}{2}$ b. $\frac{\pi}{4}$ c. $\frac{\pi}{6}$ d. $\frac{\pi}{10}$

186. $e^{i\theta}$=

a. $\cos\theta - i\sin\theta$ b. $\cos(-\theta) + i\sin\theta$ c. $\cos(-\theta) - i\sin(-\theta)$ d. $\cos\theta + i\sin(-\theta)$

187. the value of the series 1-1/3.2^2 + 1/5.2^4 – 1/7.2^6 + ... to ∞ is

a. 3$\tan^{-1}1/3$ b. 1.$\tan^{-1}1$ c. 4$\tan^{-1}1/4$ d. 2 $\tan^{-1}1/2$

188. the series $\frac{\pi}{4} + \frac{1}{2} - \frac{1}{3}.\frac{1}{2^3} + \frac{1}{5}\frac{1}{2^5} \dots \dots \dots ..is\ equal\ to$

a. $\tan^{-1}3$ b. $\tan^{-1}2$ c. $\tan^{-1}4$ d. $\tan^{-1}1$

189. $\log(1 - i\,tan\,\theta) =$

a. $\log e^{i\theta} - logsec\theta$ b. iθ $-sec\theta$ c. $-$iθ $+logsec\theta$ d. None of these

190. Gregory's series is convergent provided

a. $|\tan x| \leq 1$ b. $|\tan x| \geq 1$ c. $\tan x = 1$ d. $\tan x < 1$

191. The value of the series $1 - \frac{1}{3.3} + \frac{1}{5.3^2} - \frac{1}{7.3^3} + \cdots \dots \dots$.. to ∞ is

a. $\frac{\pi}{3\sqrt{3}}$ b. $\frac{\pi}{2\sqrt{2}}$ c. $\frac{\pi}{3\sqrt{2}}$ d. $\frac{\pi}{2\sqrt{3}}$

192. Sinhx =

a. sinix b. isinix c. –isinix d. None

193. cosix =

a. icoshx b. coshx c. –icoshx d. None

194. Choose the correct answer :

a. $\coth^2 x - \text{cosech}^2 x = 1$ b. $\coth^2 x + \text{cosech}^2 x = 1$

c. $\text{cosech}^2 x - \coth^2 x = 1$ d. None

195. Choose the correct answer :

a. $1 + \cosh 2x = 2\sinh^2 x$ b. $1 + \cosh 2x = 2\cosh^2 x$

c. $1 - \cosh 2x = 2\cosh^2 x$ d. None

196. If x + iy = sin(A + iB) then $\frac{x^2}{sin^2 A} - \frac{y^2}{cos^2 A}$

a. 0 b. 1 c. -1 d. None

197. sinhx =

a. $x + \frac{x^3}{3!} + \frac{x^5}{5!} + \cdots$ .... b. $x + \frac{x^3}{3} + \frac{x^5}{5} + \cdots$ ....

c. . $x + \frac{x^2}{2!} + \frac{x^4}{4!} + \cdots$ .... d. None

198. $\text{Cosh}^{-1} x$ =

a. $\log(x + \sqrt{x^2+1})$ b. $\log(x - \sqrt{x^2+1})$ c. $\log(x + \sqrt{x^2-1})$ d. None

199. If sinhx = ¾ then the value of x =

a. 2 b. -2 c. log2 d. None

200. $\tanh^{-1} x$ =

a. $\tan^{-1} ix$ b. $i\tan^{-1} ix$ c. $-i\tan^{-1} ix$ d. None

201. $\tanh^{-1} x$ =

a. $\log\frac{1+x}{1-x}$ b. $\log\frac{1-x}{1+x}$ c. $\frac{1}{2}\log\frac{1+x}{1-x}$ d. None

202. sinh0 =

a. 0 b. 1 c. ∞ d. None

203. sinh(x + y) . cosh(x - y) is equal to

a. sinh2x + sinh2y b. $\frac{1}{2}$(sinh2x + sinh2y)

c. $\frac{1}{2}$(sinh2x – sinh2y) d. None

204. If $\cos(\theta + i\emptyset) = \rho(cos\alpha + i\ sin\alpha)$ then the value of $\rho\ sin\alpha$ is

a. $cos\theta. cosh\emptyset$ b. $-cos\theta. cosh\emptyset$

c. $sin\theta. sinsh\emptyset$ c. $-sin\theta. sinh\emptyset$

205. Which of the following result is incorrect ?

a. sinz = isinhizx b. cosz = coshiz

c. tanz = -itanhiz		d. none of these

206. $\sin\alpha + \sin 2\alpha + \sin 3\alpha$.......+ $\sin n\alpha$ =

a. $\frac{sin\frac{1}{2}(n+1)\alpha.sin\frac{1}{2}n\alpha}{cos\frac{1}{2}\alpha}$		b. $\frac{sin\frac{1}{2}(n-1)\alpha.sin\frac{1}{2}n\alpha}{cos\frac{1}{2}\alpha}$

c. $\frac{sin\frac{1}{2}(n-1)\alpha.sin\frac{1}{2}n\alpha}{sin\frac{1}{2}\alpha}$		d. $\frac{sin\frac{1}{2}(n+1)\alpha.sin\frac{1}{2}n\alpha}{sin\frac{1}{2}\alpha}$

207. $\cos\alpha + \cos 2\alpha + \cos 3\alpha$.......+ $\cos n\alpha$ =

a. $\frac{cos\frac{1}{2}(n+1)\alpha.sin\frac{1}{2}n\alpha}{sin\frac{1}{2}\alpha}$		b. $\frac{cos\frac{1}{2}(n+1)\alpha.cos\frac{1}{2}n\alpha}{sin\frac{1}{2}\alpha}$

c. $\frac{cos\frac{1}{2}(n+1)\alpha.cos\frac{1}{2}n\alpha}{cos\frac{1}{2}\alpha}$		d. none

208. $\tan^{-1}\frac{x}{1+\gamma(\gamma+1)x^2}$ =

a. $\tan^{-1}(\gamma+1)x + \tan^{-1}\gamma x$		b. $\tan^{-1}(\gamma-1)x + \tan^{-1}\gamma x$

c. $\tan^{-1}(\gamma+1)x - \tan^{-1}\gamma x$		d. $\tan^{-1}(\gamma-1)x - \tan^{-1}\gamma x$

209. $\tan^{-1}\frac{1}{2\gamma^2}$ =

a. $\tan^{-1}(2\gamma+1) - \tan^{-1}(2\gamma-1)$		b. $\tan^{-1}(2\gamma+1) + \tan^{-1}(2\gamma-1)$

c. $\tan^{-1}(2\gamma-1)x - \tan^{-1}(2\gamma+1)$		d. None

210. $log\frac{1+x}{1-x} =$

a. x - $\frac{x^3}{3!}$ + $\frac{x^5}{5!} - \cdots$		b. x + $\frac{x^3}{3}$ + $\frac{x^5}{5} + \cdots$ ....

c.2(x + $\frac{x^3}{3}$ + $\frac{x^5}{5} + \cdots$ ....)		d.2(x - $\frac{x^3}{3!}$ + $\frac{x^5}{5!} + \cdots$ ....)

211. $\tan^{-1}x =$

a. x + $\frac{x^3}{3}$ + $\frac{x^5}{5} + \cdots$		b. x $-\frac{x^3}{3}$ + $\frac{x^5}{5} - \cdots$ ....

c. x $-\frac{x^2}{2}$ + $\frac{x^3}{3} - \cdots$		d. None of these

212. $(C + iS)$ method is applied for finding the sum of series of the form having

a. Sine and tangents of multiple of angles

b. Cosine and sine of multiple of angles .

c. Cosine and cotangent of multiple of angles

d. None of these.

213. The companion series corresponding to the series

$\cos\theta\,.\,cos\theta + \frac{cos^2\theta}{2!}.\,cos2\theta + \frac{cos^3\theta}{3!}.\,cos3\theta$....... Is

a. $\sin\theta\,.\,sin\theta + \frac{sin^2\theta}{2!}.\,sin2\theta + \frac{sin^3\theta}{3!}.\,sin3\theta$.......

b. $\sin\theta\,.\,cos\theta + \frac{sin^2\theta}{2!}.\,cos2\theta + \frac{sin^3\theta}{3!}.\,cos3\theta$.......

c. $\cos\theta\,.\,sin\theta + \frac{cos^2\theta}{2!}.\,sin2\theta + \frac{cos^3\theta}{3!}.\,sin3\theta$.......

d. None of these.

214. Sum of the series

$\cos\alpha\ +\ \cos\left(\alpha + \frac{2\pi}{n}\right) +\ \cos\left(\alpha + \frac{4\pi}{n}\right) + \cdots \ldots \ldots \cos\left(\alpha + \frac{2(n-1)\pi}{n}\right)\ is$

a. -1 b. 0 c. 1 d. None of these

215. Sum of the series

$\sin\alpha\ +\ \sin\left(\alpha + \frac{2\pi}{n}\right) +\ \sin\left(\alpha + \frac{4\pi}{n}\right) + \cdots \ldots \ldots \sin\left(\alpha + \frac{2(n-1)\pi}{n}\right)\ is$

a. -1 b. 1 c. 0 d. None of these

216. Sum of series $\sin\alpha\ +\ \frac{\sin 2\alpha}{2!} + \frac{\sin 3\alpha}{3!} +$ to ∞ is

a. $e^{\cos\alpha}.\cos(\cos\alpha)$ b. $e^{\cos\alpha}.\sin(\cos\alpha)$ c. $e^{\cos\alpha}.\sin(\sin\alpha)$ d. $e^{\cos\alpha}.\cos(\sin\alpha)$

Theory of equations

217. The equation x^n - 1 =0 will have real roots 1 and -1 when n is

a. odd b. even c. prime number d. none of these

218. The equation X^n -1 =0 has only one real root 1 , when n is

a. even b. prime c. odd d. none of these

219. If 2 – 3i and 1+i are the two roots of a equation , then the required equation be :

a. $X^4 - 6X^3 + 23X^2 - 34X + 26 = 0$ b. $X^4 + 6X^3 - 23X^2 - 34X + 26 = 0$

c. $X^4 + 6X^3 + 23 X^2 - 34 X + 26 = 0$ d. none of these

220. The common roots of $X^3 - 7X + 6 = 0$ and $2X^3 - 3X^2 - 5x + 6 = 0$ are

a. 2 , - 3 b. -3 , 1 c. 1 , 2 d. – 3 , - 3/2

221. The equation $x^5 - x + 16 = 0$ has ….. pairs of imaginary roots :

a. one b. three c. two d. none of these

222. The equation $x^{12} - x^4 + x^3 - x^2 + 1 = 0$ has at least……… Complex roots :

a. four b. two c. six d. none of these

223. The equation $x^3 + x^2 - x + 15 = 0$ has one of the roots – 3 , then the other roots be :

a. 3 , 5 b. $1 \pm 2i$ c. $2 \pm 1.i$ d. none

224. If one root of the equation $x^3 - 13 x^2 + 15 x + 189 = 0$ exceeds the other by 2 , then the roots of this equation are:

a. -7 , 3 , 9 b. -3 , 7 , 9 c. -9 , 3 , 7 d. none

225. If a , b , c , ………, 1 are the roots of the equation $x^n - 1 = 0$ then (1 – a) (1 – b) (1 – c) ………. is =

a. 0 b. 1 c. ∞ d. n

226. If (x) = $2 x^4 - 5x^2 - 32 x + 6$ then f (- 4) =

a. 566 b. -566 c. 27 d. none

227. The equation $3 x^3 - 4x^2 + x + 88 = 0$ has one of its roots $2 + i\sqrt{7}$ then other roots are :

a. $2 - i\sqrt{7}$, 8/3 b. $2 + i\sqrt{7}$, 8/3 c. $2 - i\sqrt{7}$, - 8/3 d. none

228. In the equation $x^3 - 7x^2 + 36 = 0$, one roots is double to another , there the roots are :

a. -2 , -3 , 6 b. -2 , 3 , -6 c. -2 , -3 , -6 d. -2 , 3 , 6

229. If the difference of two roots of the equation $x^3 - 7x^2 + 36 = 0$ is 5 , then the roots are :

a. -2 , 3 , 6 b. -2 , -3 , 6 c. -2 , -3 , -6 d. -2 , 3 , -6

230. If the roots of $3x^3 -26 x^2 + 52x – 24 = 0$ are in G,P. then the roots are:

a. 2 , 4 , 8 b. 2/3 , 2 , 6 c. 1 , 2 , 4 d. none

231. If the product of two roots of the equation $x^3 - 5x^2 – 2x + 24 = 0$ is 12 then the roots are :

a. 2 , 6 , -2 b. 3 , 4 , -2 c. -3 , 4 , -2 d. 3 , 4 , 2

232. If the roots of the equation $2x^3 – 15x^2 + 37x – 30 = 0$ are in A.P. then the roots be:

a. .3 , 2 , 5/2 b. 1 , 3 , 5 c. 3 , 5/2 , 2 d. 2 , 3 , 5/2

233. The cubic $2x^3 - 9x^2 + 12x + \lambda = 0$ *has* two equal roots then the value of ʎ and all the roots are

a. λ = - 4 roots be 2 , -2 , ½ b. λ = -4 , roots be 2,2 ½

c. λ = -4 , roots be 1,1,5/2 d. None

234. For a cubic equation having roots α , β , γ we have $\sum \alpha^2 =$

a. $(\sum \alpha)^2 - 2\sum \alpha\beta$ b. $\sum \alpha^2 - \sum \alpha\beta$ c. $\sum \alpha^2 +2\sum \alpha\beta$ d. None of these

235. For a cubic equation having roots α , β , γ we have $\sum \alpha^2\beta =$

a. $\sum \alpha.\sum \alpha\beta - \sum \alpha\beta\gamma$ b. $\sum \alpha.\sum \alpha\beta -2 \sum \alpha\beta\gamma$

c. $\sum \alpha.\sum \alpha\beta - 3 \sum \alpha\beta\gamma$ d. None of these

236. For a cubic equation having roots α , β , γ we have $\sum \alpha^3 =$

a. $\sum \alpha. \sum \alpha^2 - \sum \alpha^2 \beta$ b. $\sum \alpha. \sum \alpha^2 - 2 \sum \alpha^2 \beta$

c. $\sum \alpha. \sum \alpha^2 -3 \sum \alpha^2 \beta$ d. None of these

237. For a cubic equation having roots α , β , γ we have $\sum \frac{1}{\alpha} =$

a. $\frac{\sum \alpha\beta}{2\alpha\beta\gamma}$ b. $\frac{\sum \alpha\beta}{3\alpha\beta\gamma}$ c. $\frac{\sum \alpha\beta}{\sum \alpha\beta\gamma}$ d. None

238. For a biquadratic equation having roots $\alpha , \beta , \gamma , \delta$ we have $\sum \alpha^2 =$

a. $(\sum \alpha)^2 -\sum \alpha\beta$ b. $(\sum \alpha)^2 -2\sum \alpha\beta$ c. $(\sum \alpha)^2 - 3\sum \alpha\beta$ d. None

239. For a biquadratic equation having roots $\alpha , \beta , \gamma, \delta$ we have $\sum \alpha^2\beta =$

a. $\sum \alpha .\sum \alpha\beta -\sum \alpha\beta \gamma$ b. $\sum \alpha .\sum \alpha\beta -2 \sum \alpha\beta \gamma$ c. $\sum \alpha .\sum \alpha\beta -3\sum \alpha\beta \gamma$ d. None

240. For a biquadratic equation having roots $\alpha , \beta , \gamma, \delta$ we have $\sum \alpha^2\beta \gamma =$

a. $\sum \alpha .\sum \alpha\beta \gamma - \alpha\beta\gamma\delta$ b. $\sum \alpha .\sum \alpha\beta \gamma - 2\alpha\beta\gamma\delta$

c. $\sum \alpha .\sum \alpha\beta \gamma -3 \alpha\beta\gamma\delta$ d. $\sum \alpha .\sum \alpha\beta \gamma - 4 \alpha\beta\gamma\delta$

241. For a biquadratic equation having roots $\alpha , \beta , \gamma, \delta$ we have $\sum \alpha^3\beta =$

a. $\sum \alpha^2. \sum \alpha\beta - \sum \alpha^2\beta\gamma$ b. $\sum \alpha^2. \sum \alpha\beta -2 \sum \alpha^2\beta\gamma$

c. $\sum \alpha^2 . \sum \alpha\beta - 3\sum \alpha^2\beta\gamma$ d. $\sum \alpha^2 . \sum \alpha\beta - 4\sum \alpha^2\beta\gamma$

242. If $\sum \alpha = -p$, $\sum \alpha\beta = -q$ and $\alpha\beta\gamma = -r$ then the corresponding equation is given by

a. $x^3 - px^2 - qx - r = 0$. b. $x^3 - px^2 + qx - r = 0$

c. $x^3 + px^2 + qx - r = 0$ d. $x^3 + px^2 - qx + r = 0$

243. If $\sum \alpha = 3, \sum \alpha\beta = 4$ and $\alpha\beta\gamma = -7$ then the corresponding equation is given by

a. $x^3 + 3x^2 - 4x + 7 = 0$. b. $x^3 + 3x^2 + 4x - 7 = 0$

c. $x^3 - 3x^2 + 4x + 7 = 0$ d. $x^3 - 3x^2 + 4x - 7 = 0$

244. If $\sum \alpha = -p$, $\sum \alpha\beta = q$, $\sum \alpha\beta\gamma = r$ and $\alpha\beta\gamma\delta = -s$ then the corresponding equation is given by

a. $x^4 - px^3 + qx^2 + rx - s = 0$. b. $x^4 + px^3 - qx^2 - rx + s = 0$.

c. $x^4 + px^3 + qx^2 + rx - s = 0$. d. $x^4 + px^3 + qx^2 - rx - s = 0$.

245. If $\sum \alpha = -2$, $\sum \alpha\beta = -3$, $\sum \alpha\beta\gamma = -4$ and $\alpha\beta\gamma\delta = -5$ then the corresponding equation is given by

a. $x^4 - 2x^3 - 3x^2 - 4x - 5 = 0$. b. $x^4 + 2x^3 + 3x^2 + 4x - 5 = 0$.

c. $x^4 + 2x^3 - 3x^2 + 4x - 5 = 0$. d. None of these.

246.If α, β, γ be the roots of the equation $x^3 + p x^2 + q x + r = 0$ then $\sum \alpha^2 =$

a. $p^2 + 2q$ b. $p^2 - 2q$ c. $-p^2 + 2q$ d. None

247. .If α, β, γ be the roots of the equation $x^3 + p x^2 + q x + r = 0$ then $(\sum \alpha\beta)^2 =$

a. $p^2 + 2qr$ b. $q^2 + 2pr$ c. $q^2 - 2pr$ d. None

248. If α, β, γ and δ be the roots of the biquadratic equation $x^4 + x^3 + x^2 + x + 1 = 0$ then $\sum \alpha^2 =$

a. 0 b. 1 c. 2 d. -1

249. . If α, β, γ and δ be the roots of the biquadratic equation $x^4 - x^3 + x^2 - x + 1 = 0$ then $\sum \alpha^2\beta =$

a. 0 b. 1 c. 2 d. -2

250. . If α, β, γ be the roots of the equation $x^3 - x^2 + x - 1 = 0$ then $\sum \alpha^2 =$

a. 0 b. 1 c. -1 d. 2

251. . If α, β, γ be the roots of the biquadratic equation $x^3 + x^2 + x + 1 = 0$ then $\sum \frac{1}{\alpha} =$

a. 0 b. 1 c. -1 d. None

Linear programming

252. Currently linear programming problem is used in solving a wide range of practical :

a. Business problem b. Agricultural problem

c. Manufacturing problem d. none of these

253. L.P.P. is exactly used is solving in solving what kind of resource allocation problems ?

a. production planning and scheduling b. transportation

c. sales and advertising d. All of the above

254. How many methods are there to solve L.P.P. ?

a. Three b. Two c. four d. None of the above

255. Any solution of A.L.P.P. which satisfies the non-negativity restrictions of L.P.P. is called its …….

a. Unbounded solution b. optimal solution

c. Feasible solution d. Both (a) and (b)

256. Simple L.P.P. with ……variables can be easily solved by graphical methods :

a. One decision b. Four decision c. Three decision d. Two decision

257. Linear programming is major innovation since ………..in the field of business decision making particularly under condition of certainty

a. Industrial revolution b. World War 1 c. World War 2 d. French revolution

258. Any feasible solution which optimizes (minimize or maximize) the objective function of the L.P.P is called its :

a. Optimal solution b. None – basic variables

c. solution d. Basis feasible solution

259. A basic solution which also satisfies the condition in which all basic variables are

non negative is called :

a. Basic feasible solution b. feasible solution

c. Optimal solution d. None of the above

260. An objective function is maximized when it is a …….. function

a. Passive b. Profit c. Cost d. None of these

261. A set of values x_1 , x_2 , x_3 ,……..,x_n which satisfied the constraints of the L.P.P. is called

a. solution b. variable c. linearity d. none of these

262. Linear programming has been successfully applied in :

a. Agricultural b. Industrial application c. Both (a) and (b) d. Manufacturing

263. The objective function and constraints are linear relationship between

a. variables b. constraints c. functions d. all of the above

264. ……….. are expressed in the form of in equalities or equation :

a. constraints b. objective functions c. both(a) and (b) d. none of these

265. The graphical method of L.P. problem uses

a. objective function equation b. constraint equation

c. linear equation d. all of the above

266. While plotting constraints on a graph paper , terminal points on both the axis are connected by a Straight live because:

a. The resources are limited in supply b. the objective function is a linear function

c. the constraints are linear equation or inequalities d. all of the above

267. If two constraints do not intersect in the positive quadrant of the graph , then

a. the problem is infeasible b. the solution is unbounded

c. one of the constraints is redundant d. none of these

268. Which of the following statements is true with respect to the optimal solution of an L.P. problem :

a. every L.P. problem has an optimal solution

b. optimal solution of an L.P. problem always occurs at an extreme point .

c. at optimal solution all resources are used completely

d. if an optimal solution exists , there will always be at least one at a corner

269. In a L.P. problem with m restriction in n variables , the maximum number of basic feasible solution are :

a. $n_{C_{m+1}}$ b. . $n_{C_{m-2}}$ c. . n_{C_m} d. . $n_{C_{m-1}}$

270. Before formulating a formal L.P. model , it is better to

a. express each constraint in words b. express the objective function in words

c. decision variables are identified verbally. d. all of the above.

271. Non-negativity condition is an important component of L.P. model , because

a. variables should remain under the control of decision maker

b. value of variables make sense and correspond of real world problem .

c. variables are interrelated in terms of limited resources

d. none of these

272. Constraints in an L.P. problem model represents:

a. Limitations　　b. requirements

c. balancing limitations and requirements　　d. all of the above

273. Objective function of a L.P. problems is

a. A constant　　b. Function to be optimized

c. A relation between the variables　　d. none of these

274. Feasible region is the set of points which satisfy

a. the objective functions　　b. some of the given constraints

c. all the given constraints　　d. None of these

275. Maximum value of Z = 5X + 3Y subject to the constraints $3X + 5Y \leq 15$, $5X + 2Y \leq$, $X , Y \geq 0$ is

a. $12^{7}/_{19}$　　b. 10　　c. $14\ ^{8}/_{19}$　　d. none

276. Maximum value of Z = 3x + 5y subject to $x + 2y \leq 20$, $x + y \leq 15$, $y \leq 8$, $x , y \geq 0$ is

a. 52　　b. 45　　c. 50　　d. none

277. Minimum value of Z = 3X + 5Y subject to $X + 3Y \geq 3$, $X+Y \geq 2$, $X , Y \geq 0$ is

a. 6　　b. 7　　c. 5　　d. None

278. Maximum value of Z = 2x + 3y subject to $x +y \leq 1$, $3x + y \leq 4$, x, y , $\geq$, 0 is

a. 3　　b. 2　　c. 4　　d. none

279. Maximum value of Z = 6x + 11y subject to $2x + y \leq 104$, x + 2y = 76 , $x , y \geq 0$ is

a. 444　　b. 440　　c. 880　　d. none

280. Maximum value of Z = x + 3y subject to $3x + 6y \leq 8$, $5x + 2y \leq 10$, $x , y \geq 0$ is

a. 4　　b. 2　　c. 6　　d. none

281. The live segment of the victors a and b in n – dimensional space is the set of victors

a. $u = a + (1 + \lambda) b , 0 \leq \lambda \leq 1$　　b. $u = a + (1 - \lambda) b , 0 \leq \lambda \leq 1$

c. $u = \lambda a + (1 - \lambda) b , 0 \leq \lambda \leq 1$　　d. $u = \lambda a + (1 + \lambda) b , 0 \leq \lambda \leq 1$

282. Given a set of vectors $V_1 , V_2 , V_3 , \ldots V_m \in R^n$, a liner combination $V = \alpha_1 V_1 + \alpha_2 V_2 + \alpha_3 V_3 + \ldots + \alpha_m V_m$ where α_j ' s are scalars , is called a convex combination of the given vectors , if $\alpha_1 , \alpha_2 , \alpha_3 , \ldots, \alpha_m \geq 0$ and

a. $\sum_{i=1}^{m} \alpha_i$ = m b. $\sum_{i=1}^{m} \alpha_i$ = 1 c. $\sum_{i=1}^{m} \alpha_i$ = m! d. None

283. Which of the following set is not convex

a. $S = \{ (x_1 , x_2) \mid x_1 \geq 2 , x_2 \leq 3 \}$

b. . $S = \{ (x_1 , x_2) \mid x_1^2 + x_2^2 \leq 4 \}$

c. . $S = \{ (x_1 , x_2) \mid 4 x_1^2 + 9x_2^2 \leq 36 \}$

d. . $S = \{ (x_1 , x_2) \mid x_2 -3 \geq -x_1^2 , x_1 \geq 0 , x_2 \geq 0 \}$

284. If x_1 , x_2 be any two points in a hyperplane then which one of the following points lies on the hyperplane

a. $\wedge x_1 + (1 - \wedge) x_2 , 0 \leq \wedge \leq 1$

b. $\wedge x_1 + (1 + \wedge) x_2 , 0 \leq \wedge \leq 1$

c. $\wedge x_1 - (1 - \wedge) x_2 , 0 \leq \wedge \leq 1$

d. $x_1 + (1 - \wedge) x_2 , 0 \leq \wedge \leq 1$