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01 No. Classes

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Under the Guidence of

Amit Katiyar

Complete Notes

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1. If A stands for ADD, B for SUBTRACT, C for MULTIPLY and D for DIVIDE then which of the following stands for 2A3B4D2?
(a) 3 (b) 2
(c) 4 (d) 5

2. Bantu is the brother of Chetna, who has another brother Arun. Deepak is the husband of Chetna, Arun is the son of Rita. Thus Rita is the ….. of Deepak?
(a) Aunt (b) Mother
(c) Sister-in-law (d) Mother-in-law

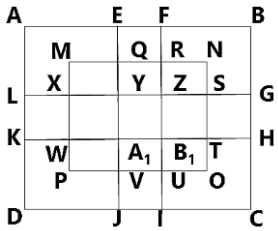
3. When two coins are tossed simultaneously, what are the chances of getting at least one tail?
(a)3/4 (b) 1/5
(c) 4/5 (d) 1/4

4. Ms. Forest likes to let her student choose who their partners will be; however, no pair of students may work together more than seven class period in a row. Adam and Baxter have studied together seven class periods in a row. Carter and Dennis have worked together three class periods in a row. Carter does not want to work with Adam. Who should be assigned to work with Baxter?
(a) Forest (b) Baxter
(c) Carter (d) Adam

5. Handsome : Beautiful :: Husband : ?
(a) Women (b) Wife
(c) Girl (d) She

6. Decode the functional arithmetic operators hidden between digits, given that 5611 = 9, 3713 = 6 and 4212 = 3. Evaluate what will be the value of 8777?
(a) 1 (b) 3
(c) 4 (d) 5

7. What is the total number of squares in the given figure below?



(a) 18 (b) 19
(c) 25 (d) 27

8. In a group of five person A, B, C, D and E one plays Tennis, one plays Chess and one Hockey. A and D are unmarried women and play no game. There is a couple them where E is husband of C. No women plays either Chess or Hockey. B is the brother of C and he neither plays Tennis nor Chess. Who plays Hockey here?
(a) A (b) B
(c) C (d) E

9. If L is the brother of K and K is the friend of M then the in Fercence 'L is the friend of M's is……
(a) true (b) false
(c) probably false or true (d) not possible

10. If education is given by the government free of charge then
i. It will help in universalization of education in the country, and
ii. there will be budgetary deficit creating some new problems.
(a) Argument (i) is strong
(b) Only argument (ii) is strong
(c) Both the arguments are strong
(d) Neither (i) nor (ii) is strong

11. In a row A is in the 11^{th} position from the left and B is in the 10^{th} position from the right. If A and B interchange, then A becomes 18^{th} from the left. How many persons are there in the row other than A and B?
(a) 27 (b) 26
(c) 25 (d) 24

12. Examine the following statements: {I watch TV only if I am bored. I am never bored when I have my brother's company. Whenever I go to the theatre, I take my brother along}. Which of the following conclusion is valid in the context of the above statements?
(a) If I am bored, I watch TV.
(b) If I am bored, I seek my brother's company.
(c) If I am not with my brother, then I watch TV.
(d) If I am not bored, I do not watch TV.

13. The total of the ages of Amar, Akbar and Anthony is 80 years. What was the total of their ages three years ago?
(a) 71 years (b) 72 years
(c) 74 years (d) 77 years

14. In a family, each daughter has the same number of brothers as she has sisters and each son has twice as many sisters as he has brothers. How many sons are there in the family?
(a) 2 (b) 3
(c) 4 (d) 5

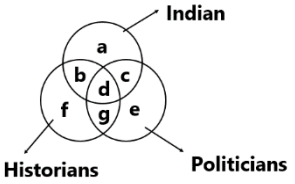
15. Look at this series: 8, 22, 8, 28, 8, ….. What number should come next?
(a) 9 (b) 29
(c) 32 (d) 34

16. Which word does NOT belong with the others?
(a) inch (b) ounce
(c) centimeter (d) yard

17. If in a code language COME is coded as XLNV, then the code for CAT will be ….
(a) XZG (b) CMW
(c) YMN (d) XWG

18. If + means ÷ , × means –, – means × & ÷ means +, then 38 + 19 – 16 × 17 ÷ 3 = ?
(a) 16 (b) 19
(c) 18 (d) 12

19. Which of the following represents 'Indians and historians but not politicians' based on the Venn diagram here?
(a) b
(b) f
(c) b and f
(d) b and g



20. Which of the following is correct expression by English grammar?
(a) He is sleeping for two hours.
(b) We had gone to the movies last night.
(c) I have seen him yesterday.
(d) Neither of the boys has returned.

21. The musicians delivered a rousing performance ….. they had rehearsed often.
(a) Though (b) As
(c) Once (d) Lest

22. Grain is malted by first soaking it in water, then allowing it to sprout, and finally drying it ….. stop the sprouting.
(a) in order to (b) to order to
(c) into order to (d) with order to

23. Mount Everest, the highest elevation in the world, …… in 1953 by members of an expedition including Sir Edmund Hillary and Tenzing Norgay.
(a) Scaled (b) First scaled
(c) Climbed (d) Won

24. The new law will …… the entire community, and everyone will be affected.
(a) Impact (b) Impede
(c) Impress (d) None

25. He died ….. a severe head injury.
(a) on (b) of
(c) from (d) with

26. Which of the following correctly represents the passive voice of 'who taught you grammar'?
(a) By whom you were taught grammar?
(b) By whom were you taught grammar ?
(c) By whom was grammar you taught?
(d) By whom were grammar taught to you?

27. The words that show that many people believe meeting are important are ……
(a) Widely held (b) Collective ability
(c) Number of people (d) Solving problems

28. We are …… a powerful enemy.
(a) up against (b) save for
(c) on be half of (d) in against

29. Which of the following is the synonym of ABBREVIATE?
(a) Shorten (b) Enlarge
(c) Decrease (d) Change

30. Which of the following is the antonym of ANONYMOUS?
(a) Desperate (b) Expert
(c) Known (d) Written

31. Which one of the following statements is false?
(a) ϕ is a relation.
(b) The cardinality of $\{\phi, \{\phi\}\}$ is 2.
(c) The set of Natural numbers and Integers are equinumerous.
(d) An irreflexive relation is neither symmetric nor transitive relation.

32. In how many was can the letters of the word 'LOADING' be arranged in such a way that the vowels always come together?
(a) 360 (b) 480
(c) 720 (d) 524

33. What will the value of
f(x) = (Sin 3x + Sin x) Sin x + (Cos 3x – Cos x) Cos x?
(a) 0 (b) 1
(c) –1 (d) 2

34. The relation represented by
R = {(1,1), (2, 2) (3, 3), (1,2) (1,3), (2,3), (2, 1), (3,2)}
on the set A = {1, 2, 3} is …… relation.
(a) A reflexive and symmetric but not transitive
(b) A reflexive and transitive but not symmetric
(c) A symmetric and transitive but not reflexive
(d) An equivalence.

35. Which of the following indicates the first step of mathematical induction for the mathematical statement n + 1 > n?
(a) 2 > 1 (b) 2 > 0
(c) 1 < 2 (d) 0 < 2

36. What will be the next permutation in lexicographic order after 362541?
(a) 364125 (b) 412563
(c) 361425 (d) 361420

37. Which of the following expresses the given complex number $(1 – i)^4$ in the form (a + i b)
(a) 1 – 4i (b) – 4i
(c) –4 (d) 1

38. In how many ways can the letters of the word 'LEADER' be arranged?
(a) 72 (b) 144
(c) 360 (d) 720

39. Objective of linear programming for an objective function is to ..
(a) maximize or minimize
(b) subset or proper set modelling
(c) row or column modeling
(d) adjacent modeling

40. The differential equation
$2dy/dx + x^2y = 2x + 3$, $y(0) = 5$ will be …
(a) Linear
(b) non linear
(c) linear with fixed constants
(d) undeterminable to be linear or nonlinear

41. The order of the differential equation corresponding to the family of curves $y = c(x - c)^2$, c is constant is ……
(a) 1 (b) 2
(c) 3 (d) 4

42. Area bounded by the curve $y = \sin x$ and the x-axis between $x = 0$ and $x = 2\pi$ is ….. sq units.
(a) 2 (b) 0
(c) 3 (d) 4

43. The area of the region bounded by the curve $y = 1/x$, the x-axis and between $x = 1$ to $x = 6$ is …….. sq units.
(a) $\text{Log}_e 5$ (b) 0
(c) $\text{Log}_e 6$ (d) $\text{Log}_e 7$

44. $\int \frac{\sin x+\cos x}{\sqrt{1+\sin 2x}}\,dx, \frac{3\pi}{4} < x < \frac{7\pi}{4}$ is equal to
(a) $\log|\sin x + \cos x|$ (b) x
(c) $\log|x|$ (d) $-x$

45. The equation of the normal to the curve $y = \sin x$ at (0, 0) is …..
(a) $x = 0$ (b) $y = 0$
(c) $x + y = 0$ (d) $x - y = 0$

46. The curves $y = ae^{-x}$ and $y = be^{x}$ are orthogonal if …..
(a) $a = b$ (b) $a = -b$
(c) $ab = -1$ (d) $ab = 1$

47. If $|\vec{a}| = 4$ and $-3 \le \lambda \le 2$ then the range of $|\lambda\vec{a}|$ is …
(a) [0, 8] (b) [-12, 8]
(c) [0, 12] (d) [8, 12]

48. The distance of point (2,5,7) from the x-axis is…..
(a) 2 (b) $\sqrt{74}$
(c) $\sqrt{29}$ (d) $\sqrt{53}$

49. Three balls are drawn from a bag containing 2 red and 5 black balls, if the random variable X represents the number of red balls drawn, then X can take values …..
(a) 0, 1, 2 (b) 0, 1, 2, 3
(c) 0 (d) 1, 2

50. A black and a red die are rolled together. What is the conditional probability of obtaining the sum 8, given that the red die resulted in a number less than 4?
(a) 1/3 (b) 1/4
(c) 1/9 (d) 1/2

51. What will be the mean and variance for the first n natural numbers?
(a) $(n + 1)/2$ and $(n^2 + 1)/12$
(b) $n(n + 1)/2$ and $(n^2 + 1)/12$
(c) $(n + 1)/2$ and $(n^2 - 1)/12$
(d) $n(n + 1)/2$ and $(n^2 - 1)/12$

52. The mean and standard derivation of marks obtained by 50 students of a class in three subjects physics, mathematics and chemistry are as follows:

Subject	Mathematics	Physics	Chemistry
Mean	42	32	40.9
Standard Deviation	12	15	20

Which of the subjects show the highest and lowest variabilities respectively?
(a) Mathematics, Physics
(b) Chemistry, Mathematics
(c) Mathematics, Chemistry
(d) Chemistry, Physics

53. What will the following evaluate to?
$\lim_{x\to 4}\left(\frac{4x+3}{x-2}\right)$
(a)19/2 (b) 13/2
(c) 11/3 (d) 7/5

54. What will be the limiting value of the $f(x) = |x| - 5$ when $x \to 5$?
(a) 0 (b) 1
(c) –1 (d) –2

55. The distance between $P(x_1,y_1)$ and $Q(x_2,y_2)$ when PQ is…
(a) parallel to the y-axis
(b) parallel to the x-axis
(c) perpendicular to x-axis
(d) perpendicular to y-axis

56. What is the value of x for which the point (x, -1), (2, 1) and (4,5) are collinear?
(a) 1 (b) 2
(c) –1 (d) 0

57. For which value of k, the line given by
$(k-3)x - (4-k^2)y + k^2 - 7k + 6 = 0$ will be Parallel to the x-axis?
(a) 2 (b) 3
(c) –3 (d) 0

58. What will the value of $(102)^5$?
(a) 11040808032 (b) 11040806032
(c) 11040606032 (d) 11040606034

59. What will be an approximation of $(0.99)^5$ using the first three terms of its expansion?
(a) 0.954 (b) 0.952
(c) 0.951 (d) 0.953

60. What is the number of non-zero integral solutions of the equation f $|1 - i|^x = 2^x$
(a) 1 (b) –1
(c) 0 (d) 2

61. If six out ten points in a plane are collinear, then the number of triangles formed by joining these points will be …. 100.
(a) < (b) ≥
(c) ≤ (d) =

62. The coefficient of the middle term in the binomial expansion in powers of x of $(1+ax)^4$ and of $(1-ax)^6$ is the same, if a is equal to:
(a) -5/3 (b) 3/5
(c) -3/10 (d) 1/4

63. Three houses are available in a locality. Three persons apply for the houses. Each applies for one house without consulting others. The probability that all the three apply for the same house is:
(a)5/9 (b) 1/9
(c) 8/9 (d) 2/9

64. The statement $p \rightarrow (q \rightarrow p)$ is equivalent to ..
(a) $p \rightarrow (q \rightarrow q)$ (b) $p \rightarrow (\sim p \vee q)$
(c) F (d) T

65. For y = Sin x + Cos x – 5a, what is the value of dy/dx?
(a) Cos x – Sin x (b) Cos x + Sin x - 5
(c) Sin x – Sec x (d) Sin x + Cosx + 5

66. Which of the following functions show that the statement, 'if a function is continuous at x = 0 then it is differentiable at x = 0' is false?
(a) $f(x) = x^{4/3}$ (b) $f(x) = x^{1/3}$
(c) $f(x)=x^{-1/3}$ (d)$f(x)=x^3$

67. The equation of the circle with centre (0, 2) and radius 2 is ……
(a) $x^2 + y^2 – 2y = 0$ (b) $x^2+ y^2 + 4y = 0$
(c) $x^2 + y^2 – 3y = 0$ (d) $x^2+ y^2 – 4y = 0$

68. For a, b ∈ R define a = b to mean that |x| = |Y|. If [x] is an equivalence relation in R then the equivalence relation for [17] is….
(a) {….., –11, -7, 0, 7, 11, …}
(b) {2, 4, 9, 1115,…}
(c) {–17, 17}
(d) {5, 25, 125, ….}

69. The sets A and B have same cardinarlity if and only if there is ….. correspondence from A to B.
(a) One-to one
(b) one-to-many
(c) Many-to-many
(d) Many-to-one

70. Let the sequence be
$(1 \times 2, 3 \times 2^2, 5 \times 2^3, 7 \times 2^4, 9 \times 2^5)$…. Then this sequence is ……
(a) Anarithemetic sequence
(b) A geometric progression
(c) Airthmetico-geometric progression
(d) Harmonic progression

71. How many ways can 8 prizes be given away to 7 students, if each student is eligible for all the prizes?
(a) 40325 (b) 40320
(c) 5764801 (d) 40720

72. Which amount of postage can be formed using just 4-cent and 11-cent stamps?
(a) 2 (b) 5
(c) 30 (d) 10

73. How many bytes are required to encode 2000 bits of data?
(a) 1 (b) 2
(c) 3 (d) 8

74. The value of [1/2] [5/2] is …..
(a) 1 (b) 2
(c) 3 (d) 0

75. How many five-digit numbers can be made from the digits 1 to 7 if repetition is allowed?
(a) 16807 (b) 54629
(c) 23467 (d) 32354

76. 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

77. The product of complex numbers (4, 3) and (5–6) is ?
(a) (18, 3) (b) (18, –3)
(c) (38, 9) (d) (38, –9)

78. An object moved in a circular path of radius 21 metre such that it made an angle of 30^0. What is the distance covered by the object?
(a) 11 (b) 21
(c) 31 (d) 41

79. If A and B are matrices, then which from the following is true?
(a) A + B ≠ B + A (b) (A')' ≠ A
(c) AB ≠ BA (d) A – B = B – A

80. Under what conditions can an attribute of a binary relationship type be migrated to become an attribute of one of the participating entity types?
(a) When the relationship type is 1 : 1 or 1 : N
(b) When the relationship type is N : 1 or 1 : N
(c) When the relationship type is 1 : 1 or N : 1
(d) When the relationship type is N : 1 or N : N

81. Which primitive operations are directly performed by computer hardware?
(a) Testing & Zeroing
(b) Testing & Flipping
(c) Testing, Flipping & Zeroing
(d) Arithemtic Operations

82. Which of the following is not a computer brand:
(a) IBM (b) COMPAQ
(c) HP (d) BSNL

83. Typical speed of current fastest super computers is measured in ..
(a) Petaflops (b) GigaHertz
(c) MIPS (d) Megahertz

84. Which of the following is not an operating system?
(a) UNIX (b) DOS
(c) LINUX (d) HP

85. Which of the following refers to the foremost operation, initiated while starting a computer system?
(a) Booting (b) POST
(c) Padding (d) BIOS

86. The pair byte and nibble comprise of ……bit(s) respectively.
(a) 8 and 4 (b) 4 and 6
(c) 8 and 6 (d) 4 and 8

87. In which number system, can the binary number 1011011111000101 be the most easily converted to?
(a) Decimal (b) Hexadecimal
(c) Octal (d) Roman

88. Which of the following is true for $(p \wedge q) \rightarrow (P \vee q)$?
(a) Tautology (b) Contigency
(c) Contradiction (d) Negation

89. One of the most distinguishing features of computer system is:
(a) Speed (b) Virtual Expandability
(c) Storage (d) Precision

90. What is the name of the data metric used to refer to the size 10^{24}?
(a) Yotta (b) Zetta
(c) Exa (d) Giga

91. Which of the following is not a phase during the communication via circuit switching?
(a) Data Transfer (b) Circuit Disconnect
(c) Tunneling (d) Booting

92. Suppose you find some technical problems with the mail account user@example.com. Who should you try to contact in order to solve them?
(a) postmaster@example.com
(b) Rfc822@example.com
(c) Dns822@example.com
(d) Cyber crime Cell

93. Parallel Virtual Machine (PVM) refers to a ……
(a) Software tool (b) Workstation
(c) Super Computer (d) Loader

94. Which type, of the following languages, is directly understood by the computer without translation program?
(a) Midile Level Language
(b) High Level Language
(c) Assembly language
(d) Machine Language

95. Which of the following is not related to intrnet?
(a) Bridge (b) Router
(c) DNS (d) Printer

96. Which of the following is true about operating system?
(a) An operating system is not an algorithm.
(b) An operating system is an application software.
(c) An operating system is hardware component.
(d) An operating system is a typical firmware.

97. Which of the following is the fastest among the computer storages?
(a) Registers (b) RAM
(c) CD (d) Flash Disk

98. Ctrl, Shift and Alt keyboard keys are called …… keys.
(a) Modifier (b) Adjustment
(c) Function (d) Compiler

99. Which of the following terms is used to describe a hardware- or software-based device that protects networks from outside threats?
(a) NIC (b) Gateway
(c) Firewall (d) VDU

100. Which is not among the frontier technologies of computer system?
(a) IOT (b) Data Mining
(c) COBOL (d) Cloud Computing

ANSWER KEY

1.	a	2.	d	3.	a	4.	c	5.	b
6.	a	7.	d	8.	b	9.	c	10.	c
11.	c	12.	d	13.	a	14.	b	15.	d
16.	b	17.	a	18.	d	19.	a	20.	d
21.	b	22.	a	23.	b	24.	a	25.	c
26.	b	27.	a	28.	a	29.	a	30.	c
31.	d	32.	c	33.	a	34.	b	35.	a
36.	a	37.	c	38.	c	39.	a	40.	a
41.	a	42.	d	43.	c	44.	d	45.	c
46.	d	47.	c	48.	b	49.	a	50.	c
51.	c	52.	b	53.	a	54.	a	55.	*
56.	a	57.	b	58.	a	59.	c	60.	c
61.	d	62.	c	63.	b	64.	d	65.	a
66.	b	67.	d	68.	c	69.	a	70.	c
71.	c	72.	c	73.	b	74.	b	75.	a
76.	c	77.	d	78.	a	79.	c	80.	a
81.	c	82.	d	83.	a	84.	d	85.	a
86.	a	87.	b	88.	a	89.	a	90.	a
91.	c,d	92.	a	93.	a	94.	d	95.	d
96.	a	97.	a	98.	a	99.	c	100.	c

SOLUTION

1. **(a)** A= ADD, B = SUBTRACT, C = MULTIPLY, D= DIVIDE
2 A 3 B 4 D 2
$2 + 3 - 4/2 = 3$

2. **(d)**

Rita
|
$B^+ - GD^+ - A^+$ Option (d) Mother in law.

3. (a) 2 coins are tossed
S = (T, T) (T, H) (H, T) (H, H)
n(S) = 4, n(∈) = 3 latest one tail.
P (E) = $\frac{3}{4}$

4. **(c)**

5. **(b)** Handsome is used for husband same as beautiful is used for wife.

6. **(a)**

7. **(d)**

8. **(b)**

9. **(c)**

10. **(c)**

11. **(c)** _____ 11^{th}, 10^{th} _____
A B
_____•_____•_____
B A
Total person = 10+18-1 = 27
Except A and B = 25

12. **(d)**

13. **(a)** Amar + Akbar + Anthony = 80 yrs.
Three years ago
Amar's age – 3, + Akbar's age –3 + Anthony age -3
= 80 – 9 = 71

14. **(b)**
D = no. of daughters
S = no. of sons.
Condition 1
D– 1 = S .....(1)
Condition 2:
2 x (S–1)= D .....(2)
2 x (S – 1) = S + 1
S = 3
Ans. (b)

15. **(d)** 8, 22, 8, 28, 8 _____ what no. should some next.
Option (d)

16. **(b)** Inch, centimeter & yard are units of distance.
Ounce is unit of weight.

17. **(a)** C O M E C A T
X L N V X Z G

18. **(d)**
38 + 19 – 16 x 17 ÷ 3
38 ÷ 19 x 16 – 17 + 3
2 x 16 – 20 = 12

19. **(a)**

20. **(d)**

21. **(b)**

22. **(a)**

23. **(c)**

24. **(a)**

25. **(c)**

26. **(d)**

27. **(a)**

28. **(a)**

29. **(a)**

30. **(c)**

31. **(a)**

32. **(c)**
LOADING
LDNGOAI
5! x 3! = 120 x 6 = 720

33. (a)
f(n) = (sin 3x + sin x) sin x + (cos 3x – cos x) Cos x
(3 sin x – 4 $\sin^3$x+ sinx) sin x +
(4 $\cos^3$x – 3 cos x – Cos x) cos x
4 $\sin^2$ x – 4 $\sin^4$x + 4 $\cos^4$x – 4 $\cos^2$ x
4 ($\sin^2$x – $\cos^2$x) – 4 ($\cos^4$x –$\cos^4$x)
4($\sin^2$x – $\cos^2$x) (1–1) – 0

34. (b) R = {(1,1) (2,2) (3,3), (1,2), (1,3), (2,3), (2, 1),(2,3)
On set A = {1, 2, 3}
Reflexive
{(1,1) (2,2) (3,3), (1,2).....}
Symmetric
(1,2) ⇔ (2,1)
(1, 3) ⇔ (3,1)
Not symmetric
Transitive
(1,2) R (2,1) = (1,1)
(1,3) R (3, 2) = (1,2)
Reflesive and transitive but not symmetric.

35. (a) n + 1 > n
1 + 1 > 1 n =1
2 > 1

36. (a) After 362541
↓
[364125]

37. (c)
$(1 - i)^4 = (a + ib)$
$(1^2 + i^2 - 2i)^2$
$= (1 - 1 - 2i) = (-2i)^2 = 4i^2 = -4$

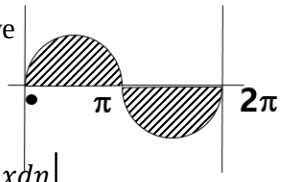
38. (c) LEADER can be arranged
$\frac{6!}{2!} = \frac{720}{2} = 360$

39. (a)

40. (b)
$\frac{2dy}{dx} + x^2y = 2x+3$
$2\left(\frac{dy}{dx} + \frac{1}{2}x^2y\right) = 2\left(x + \frac{3}{2}\right)$
$\frac{dy}{dx} + \frac{1}{2}x^2y = x + \frac{3}{2}$
$\frac{dy}{dx} + py = Q$
$y(I.F) = \int (I.F) \times Q dx + C$
$I.F. = e^{\int P\, dx}$
$P = \frac{1}{2}x^2$ and $Q = x + \frac{3}{2}$
$I.F. = e^{\int \frac{1}{2}x^2} \Rightarrow e^{\frac{1}{6}x^3}$
$y\left(e^{\frac{1}{6}x^3}\right) = \left(e^{\frac{1}{6}x^3}\right) \times \left(x + \frac{3}{2}\right) dx$
differential equation will be linear.

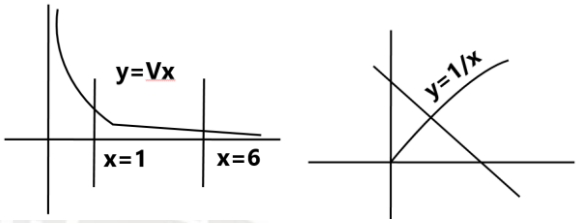
41. (a)
Order of $y = C(x - c)^2$ ……..(1)
Different of (1) w.r to n
$Y^1 = \frac{dy}{dx} = 2c(x - c)$ ……(2)
Dividing (1) by 2
$\frac{y}{y^1} = \frac{x-c}{2}$
$C = x - \frac{2Y}{Y_1}$
Putting in equation (2)
$y^1 = 2\left(x - \frac{2y}{y_1}\right)\left(x - \left(x - \frac{2y}{y_1}\right)\right)$
$(y^1)^3 = 4y\,(xy^1 - 2y)$ order = 1

42. (d) Area bounded by the curve
y = sin x
n = 0
x = 2π



Area = $\int_0^{\pi} \sin x dn + \left|\int_{\pi}^{2\pi} \sin x dn\right|$
$\Rightarrow [-\cos x]_0^{\pi} - [-\cos x]_{\pi}^{2\pi}$
$\Rightarrow$ [– cos π + cos0] + [cos2 π–cos π]
[1 +1] + [1 + 1]
= 4 sq unit Option (d)

43. (c) Area bounded by the curve y = 1/x, the x axis and between x = 1 to x = 6 is sq units.



$\int_1^6 \frac{1}{x}\, dx$
$[log\ x]_1^6 \Rightarrow log6 - log1$
= log 6 Ans.

44. (b)
$\int \frac{sin\ x + cos\ x}{\sqrt{1 + sin\ 2x}} dx$

$\int \frac{sin\ x + cos\ x}{\sqrt{(sin\ x + cosx)^2}} dx$

$\int \frac{sin\ x + cos\ x}{sinx + cos\ x} dx$

$\int 1\, dx$ = x + c

45. (c)
Eq. of normal to the curve y = sin x
$\frac{dy}{dx_{0,0}} = \cos x$
Tangent slope $\frac{dy}{dx} = 1$
Normal slope = –1
y + 0 = –1 (x + 0)
y + x = 0

46. (a)
The curve $y = ae^{-x}$ (4) and $y = be^{x} - C_2$ orthogonal
$\left(\frac{dy}{dx}\right)_{c_1} = ae^{-x}$ $\left(\frac{dy}{dx}\right)_{c_2} = be^{x}$
C_1 and C_2 orthogonal
$\left(\frac{dy}{dx}\right)_{c_1} \times \left(\frac{dy}{dx}\right)_{c_2} = ae^{-x} \times be^{x}$
$-1 = \frac{-a}{b}$
a = b

47. (b)
$-3 \le \lambda \le 2$
$-3 \times |\vec{a}| \le \lambda |\vec{a}| < 2 \times |\vec{a}|$
$-3 \times 4 \le |\lambda \vec{a}| < 2 \times 4$
$-12 \le |\lambda \vec{a}| \le 8$
$-12 \le |\lambda \vec{a}| \le 8$
$\lambda \vec{a} \in [-12, 8]$

48. (b) Distance from (2, 5, 7) to x axis
x axis (2, 0; 0)
$d = \sqrt{(2-2)^2 + (5-0)^2 + (7-0)^2}$
$= \sqrt{25+49} = \sqrt{74}$

49. (a) 2 Red
5 black
x represent no. of red balls
x = 0, 1, 2

50. (c)
Total possibility = 36
If the sum obtaining both die is 8 and the red die resulted no. is less than 4.
$n(A \cap B) \Rightarrow (2, 6)\ (3, 5)$ $\frac{2}{36} = P(A \cap B)$
P(8) = red die resulted is less than 4 is given
$P\left(\frac{A}{B}\right) = \frac{P(A \cap B)}{P(B)} = \frac{2/36}{1/2}$
$\Rightarrow \frac{1}{9}$

51. (c) Mean on vol. of first n natural no.
Mean $= \frac{n(n+1)}{2n} = \frac{n+1}{2}$
Variance $= \frac{n^2-1}{12}$

52. (c)

53. (a) $\lim_{x \to 4} \left(\frac{4x+3}{x-2}\right)$
$\Rightarrow \frac{4\times4+3}{4-2} = \frac{19}{2}$

54. (a) f(x) = |x| – 5
$x \to 5$
= 5 – 5 = 0

55. Mis print

56. (b)
Value of for which the point
A (x, –1), B(2,1) and C (4, 5) are Collinear
$M_{AB} = M_{BC}$
$\frac{2-x}{1+1} = \frac{4-2}{5-1}$ $\frac{1+1}{2-x} = \frac{5-1}{4-2}$
$\frac{2}{2-x} = \frac{4}{2}$
2– x = 0 x = 2

57. (b)
$(K-3)x - (4 - K^2)y + K^2 - 7K + 6 = 0$
Parallel to x axis M = 0
$M = \frac{Q}{b} \Rightarrow \frac{K-3}{4-k^2} = 0$
K – 3 = 0
K = 3

58. (a)
$(102)^5$
$(102)^5 = (100+2)^5$
$^5C_0\ (100)^5 2^0 + {}^5C_1\ (100)^4\ 2' + {}^5C_2\ (100)^3\ 2^2 + {}^5C_3\ (100)^2\ 2^3 + {}^5C_4\ (100)^1\ 2^4 + {}^5C_5\ (100)^0\ 2^5$
$= 100^5 + 5\ (100)^4 \times 2 + 10\ (100)^3\ 4 + 10(100)^2\ 8 + 5\ (100)\ 16 + 32$
$= 10^{10} + 10^9 + 4 \times 10^9 + 8 \times 10^5 + 8 \times 10^3 + 32$
= 14000808033

59. (c)
$(0.99)^5$
$(1-0.01)^5$
$^5C_0.(0.01)^0 + {}^5C_1(-0.01)^1 + {}^5C_2\ (0.01)^2 + {}^5C_3\ (-0.01)^3 + {}^5C_4\ (0.01)^4 + {}^5C_5\ (-0.01)^5$
$1 - 5 \times (0.01) + 10 \times (0.0001)$
$1 - 0.05 + 0.001$
$1.001 - 0.05$
0.951

60. (c)
$|1-i|^x = 2^x$
$\left(\sqrt{1+(-1)^2}\right)^x = 2^x$
$\left(\sqrt{2}\right)^x = 2^x$
$\frac{x}{2} \neq x$ $x \in 0$
Non-zero integral solution of equation is zero.

61. (d)
6 out of 10 points are collinear then no. of triangle.
$^{10}C_3 - {}^6C_3$ $^{10}C_3 = 120$
$120 - 20 = 100$ $^6C_3 = \frac{6\times5\times4}{2\times3} = 20$

62. (c)
The middle term in expansion
$(1 + \text{one})^n$
$\left(\frac{n}{2}+1\right)^{th}$ term
General term in the expansion of $(1 + ax)^4$ is
$^4C_r\ a^r\ x^r$

General term in expansion of $(1-ax)^6$ is ${}^6C_r\ a^r\ x^r$
The middle term in the expansion of $(1 + ax)^4$ is
$\left(\frac{4}{2}+1\right)^{th}$ = 3rd term
The middle term in the expansion of $(1-ax)^6$ is
$\left(\frac{6}{2}+1\right)^{th}$ = 4th term
..... ${}^4C_2\ a^2 = -6C_3\ G^3$

$$a = \frac{{}^{-4}C_2}{{}^6C_3}$$

$$= \frac{\frac{4\times3}{2\times1}}{\frac{6\times5\times4}{3\times2\times1}} = \frac{-6}{20} = \frac{-3}{10}$$

63. (b)
3 house
1st person have = 3 choices
2nd person have = 3 choices
3rd person have = 3 choices
Total possibilities = 3^3
P(E) = all 3 apply for some house
= All apply for 1st house + 2nd + 3rd house

$$\Rightarrow \frac{1}{3^3}+\frac{1}{3^3}+\frac{1}{3^3}$$

$$= \frac{3}{3^3} = \frac{1}{9}$$

64. (d)
$p \rightarrow (q \rightarrow p)$
$p \rightarrow (\sim q \vee q)$
$\sim p \vee (\sim q \vee p)$
$\sim (p \cap q) \vee p$

Q	p	q→p	P→ (q → p)
T	T	T	T
T	F	F	T
F	T	T	T
F	F	T	T

Option d
= T

65. (a)
For y = sin x + cos x – 5a, what value of $\frac{dy}{dx}$
y = sinx + cos x – 5a
$\frac{dy}{dx}$ = cos x – sin x + 0 Option (a)

66. (b)
$f(x) = x^{1/3}$
$f'(x)\ \frac{1}{3}x^{\frac{1}{3}-1}$
$f'(x) = \frac{1}{3}x^{-\frac{2}{3}}$
$f'(x) = \frac{1}{3x^{2/3}}$

67. (d) Equation with centre (0, 2) and radius 2
$X_1\ Y_1$
$(x-x_1)^2+(y-y_1)^2 = r^2$
$(x-0)^2 + (y-2)^2 = 2^2$
$X^2 + y^2 + 4 - 4y = 4$
$X^2 + y^2 - 4y = 0$

68. (c)
Given a = b
|a| = |b|
|17| = 17
Real no. x such that
|x| = 17
These no. are –17 & 17

69. (a)

70. (c)
(1 x 2, 3 x 2^2, 5 x 2^3, 7 x 2^4, 9 x 2^5 .....)
1 3 5 7 9 .....
A.P.
d= 2
2, 2^2, 2^3, 2^4, 2^5 .....G.P.
(1 x 2, 3 x 2^2, 5 x 2^3, 7 x 2^4, 9 x 2^5 .....) .....
AGP Ans.

71. (b)
8 prizes given to 7 student
$\Rightarrow$ 8 prize 2 students
8 + 7 – 1 $C_8 = \frac{14!}{8!\times6!}$ = 3003

8 x 7 x 6 x 5 x 4 x 3 x 2 = 40320

72.

73. (b) How many byte are required to encode 2000 bits of data.
2 bytes are required.

74. The value of $\left[\frac{1}{2}\right]\left[\frac{5}{2}\right]$
$\frac{1}{2}\times\frac{5}{2}=\frac{5}{4}$ = 1.25

75. (a)
7^5 = 16807

76. (c)
$7^n > n^3$ n = 3
$7^3 > 3^3$
343 > 27

77. (d) The two complex no. are
(4, 3)= 4 + 3i
(5, -6) = 5–6i
So (4, 3) x (5, -6)
= (4 + 3i) x (5–6i)
= 20 – 24i + 15i –18i^2
= 20 –9i +18, ($\because i^2$=-1)

= 38–9i
(38, –9)

78. (a)
Radius r = 21 m
Angle θ = 30 pr π/6
b = $r \times \frac{\pi}{6}$
= $7 \times \frac{\pi}{2} = 11$

79. (c)	**80. (b)**	**81. (d)**	**82.(d)**
83. (a)	**84. (d)**	**85. (a)**	**86. (a)**
87. (b)	**88. (c)**	**89. (a)**	**90. (a)**
91. (c)	**92. (a)**	**93. (a)**	**94. (d)**
95. (c)	**96. (b)**	**97. (a)**	**98. (a)**
99. (c)	**100. (d)**		