PART – A

1. The difference between the compound interest and the simple interest earned at the end of 3rd year on a sum of money at a rate of 10% per annum is Rs. 77.5. What is the sum ?

   A) Rs. 3,500 B) Rs. 2,500
   C) Rs. 3,000 D) Rs. 2,000

2. Aamir and Birju can cut 5000 g of wood in 20 min. Birju and Charles can cut 5000 g of wood in 40 min. Charles and Aamir cut 5 kg of wood in 30 min. How much time Charles will take to cut 5 kg wood alone ?

   A) 120 min. B) 48 min.
   C) 240 min. D) 120/7 min.

3. An alloy contains copper and zinc in the ratio 5 : 3 and another contains copper and tin in the ratio 8 : 5. If equal weights of the two are melted together to form a 3rd alloy, find the weight of tin per kg in the new alloy.

   A) 40/129 B) 5/13
   C) 5/26 D) 28/5

4. x is a whole number. If the only common factors of x and x2 are 1 and x, then x is _____.

   A) 1 B) a perfect square
   C) an odd number D) a prime number

5. Line AB is 24 metres in length and is tangent to the inner one of the two concentric circles at point C. Points A and B lie on the circumference of the outer circle. It is known that the radii of the two circles are integers. The radius of the outer circle is

   A) 13 m B) 5 m
   C) 7 m D) 4 m

6. Monisha is working with a real estate agent to find a location for the kids' toy store she plans to open in her town. She is looking for a place that is either in the centre or not too far from the centre of town. It should also be attractive for the right kind of footfall too. Which of the following locations should Monisha's agent call to her attention ?

   A) a storefront in a new high-rise building near the train station in the center of town whose occupants are mainly young, childless professionals who use the train to commute to their offices each day

   B) a little shop three blocks away from the town's main street, located across the street from an elementary school and next door to an ice cream store

   C) a stand-alone storefront on a quiet residential street ten blocks away from the town's center

   D) a storefront in a small strip mall located on the outskirts of town that is also occupied by a pharmacy and a dry cleaner

7. Reading is a psycholinguistic guessing game. To read critically is a skill as it is a demanding process. One must slow down one's reading and, with a pencil in hand, perform specific operations on the text. Mark up the text with reactions, conclusions and questions. When one reads, one becomes an active participant.

   This paragraph best supports the statement that

   A) critical reading is a slow, dull, but essential process.

   B) the best critical reading happens at critical times in a person's life.

   C) readers should get in the habit of questioning the truth of what they read.

   D) critical reading requires thoughtful and careful attention.

SPACE FOR ROUGH WORK

8. Find the missing term :
60, 40, 55, 45, 50, 50, ?
A) 45 B) 50
C) 55 D) 60

9. Find the missing alphabet :
T, r, O, m, J, ?
A) h B) i
C) l D) g

10. Here are some words translated from an artificial language.
qmelaqali means fruitcake
qalitiimmeo means cakewalk
useguamao means buttercup
Which word could mean "cupcake" ?
A) qalitiiqali B) amaotiimmeo
C) pakitreft D) amaoqali

11. A man walks 5 km toward south and then turns to the right. After walking 3 km he turns to the left and walks 5 km. Now in which direction is he from the starting place ?
A) West B) South
C) North-East D) South-West

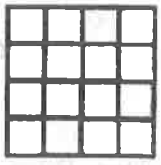
12. If the consonants in the word 'DROVE' are first arranged alphabetically and the vowels are put in between two pairs of consonants in the alphabetical order, which of the following will be the fourth from the right end after the rearrangement ?
A) D B) E
C) R D) O

13. There is a queue in a ticketing office. Amanda is 10^{th} from the front while Murthy is 25^{th} from behind and Marta is just in the middle of the two. If there be 50 persons in the queue. What position does Marta occupy from the front ?
A) 16 B) 18
C) 15 D) 17

14. There are five janitors. Pali, Qureshi, Rohan, Sant and Timber. They all have a different height, Qureshi is shorter than only Timber and Sant is shorter than Pali and Qureshi. Who among them is the shortest ?
A) Rohan
B) Sant
C) Pali
D) Data inadequate

15. A $ B means A is the father of B; A # B means A is the sister of B; A * B means A is the daughter of B and A @ B means A is the brother of B. Which of the following indicates that M is the wife of Q ?
A) Q $ R # T @ M
B) Q $ R @ T # M
C) Q $ R * T # M
D) Q $ R @ T * M

16. Count the number of squares in the given figure.



A) 32 B) 30
C) 29 D) 28

17. Who was the Viceroy of India, when Quit India Resolution was passed in 1942 ?
A) Lord Linlithgow
B) Lord Wavell
C) Lord Willingdon
D) Lord Mountbatten

SPACE FOR ROUGH WORK

18. When was the East India Association set up ?
A) 1866 B) 1857
C) 1836 D) 1885

19. Who was the Spanish navigator who set out to discover India, but instead landed on the soil of America ?
A) Christopher Columbus
B) Vasco Da Gama
C) James Cook
D) None of above

20. Which dynasty was ruling over north India when Alexander the great invaded India ?
A) Gupta Dynasty
B) Maurya Dynasty
C) Sakya Dynasty
D) Nanda Dynasty

21. The roads of cities in the Indus Valley Civilization generally divided the city into
A) Rectangular Blocks
B) Circular Blocks
C) Triangular Blocks
D) None of above

22. In which year was Pulitzer Prize established ?
A) 1917 B) 1918
C) 1922 D) 1928

23. 'Kanchipuram' is in which of the following States ?
A) Andhra Pradesh
B) Orissa
C) Kerala
D) Tamil Nadu

24. Which of the following is not a chief organ of the United Nations Organisations ?
A) International Labour Organisation
B) Security Council
C) International Court of Justice
D) General Assembly

25. Which of the following is not a member of G-15 ?
A) Indonesia B) Malaysia
C) Columbia D) India

26. The group of metals Co, Ni, Fe may best called as
A) Transition metals
B) Main group metals
C) Alkali metals
D) Rare metals

27. Non stick cooking utensils are coated with
A) Black paint B) PVC
C) Teflon D) Polystyrene

28. The international township built near Pondicherry in India in coloration with UNESCO is called
A) Elbaville
B) Auroville
C) Gayaville
D) Broadway

29. Irvin sold a book at a profit of 12%. If Irvin had sold it for Rs. 18 more, then 18% would have been gained. Find the cost price.
A) Rs. 600 B) Rs. 300
C) Rs. 400 D) Rs. 200

SPACE FOR ROUGH WORK

30. In a group of 7 people, the average age is found to be 17 years. Two more people joined with an average age 19 years. One person left the group whose age was 25 years. What is the new average age of the group ?
A) 17.5 years B) 16.5 years
C) 18 years D) 16 years

31. A 300 metre long metro train crosses a platform in a metro station in 39 seconds while it crosses a lamp post in 18 seconds. What is the length of the platform ?
A) 250 metre B) 350 metre
C) 520 metre D) 300 metre

32. Assume that a sum of money is divided equally among n girls. Each girl will receive $ 60. If another girl is added to the group and the sum is divided equally among all the girls, each child girl a $ 50 share. What is the sum of money ?
A) $ 3000 B) $ 300
C) $ 110 D) $ 10

33. A tank can be filled by one tap in 10 minutes and by another in 30 minutes. Both the taps are kept open for 5 minutes and then the first one is shut off. In how many minutes more is the tank completely filled ?
A) 5 B) 7.5
C) 10 D) 12

Direction for Questions 34 – 38 : From the four choices provided, choose the analogy that is most similar to the one in the question.

34. Wealth : Poverty
A) part : whole B) good : excellent
C) prodigal : chary D) wicked : sinful

35. Misfortune : Catastrophe
A) miniature : big
B) limited : infinite
C) knowledge : learning
D) generosity : parsimony

36. Molecule : Atoms
A) family : sisters B) light : bulb
C) tissue : cells D) body : limb

37. Limp : Walk
A) flap : fly B) run : race
C) stutter : talk D) chew : digest

38. Riddle : Solve
A) mirage : illusion B) joke : amuse
C) tangle : unravel D) target : aim

39. Fact 1 : All chickens are birds.
Fact 2 : Some chickens are hens.
Fact 3 : Female birds lay eggs.
If the first three statements are facts, which of the following statements must also be a fact ?
I. All birds lay eggs.
II. Hens are birds.
III. Some chickens are not hens.
A) II only
B) II and III only
C) I, II and III
D) None of the statements is a known fact

40. What is the most essential thing for election ?
A) President B) Voter
C) November D) Nation

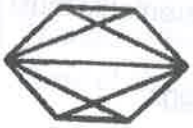
SPACE FOR ROUGH WORK

41. What is the most essential thing for ovation ?
A) outburst B) bravo
C) applause D) encore

42. Introducing a man to her husband, a woman said, "His brother's father is the only son of my grandfather." How is the woman related to this man ?
A) Mother B) Aunt
C) Sister D) Daughter

43. Pointing to a photograph, a man said, "I have no brother or sister but that man's father is my father's son." Whose photograph was it ?
A) His Own
B) His Son
C) His Father
D) His Grandfather

44. Find the number of quadrilaterals in the given figure.



A) 6 B) 7
C) 9 D) 11

45. Count the number of convex pentagons in the adjoining figure.

A) 16 B) 12
C) 8 D) 4

Read the information given below and then answer questions 46 – 49 : There is a family of six people whose nick names are Pat, Qat, Rat, Sat, Tat and Uat. Their professions are Engineer, Doctor, Teacher, Salesman, Manager and Lawyer.
There are two married couples in the family.
The Manager is the grandfather of Uat, who is an Engineer
Rat, the Salesman, is married to the lady Teacher
Qat is the mother of Uat and Tat.
The Doctor, Sat is married to the Manager.

46. How many male members are there in the family ?
A) Two B) Three
C) Four D) Data Inadequate

47. What is the profession of Pat ?
A) Lawyer
B) Lawyer or Teacher
C) Manager
D) None of these

48. Who are the two married couples in the family ?
A) Pat-Qat and Sat-Rat
B) Rat-Uat and Sat-Tat
C) Pat-Tat and Sat-Rat
D) Pat-Sat and Rat-Qat

49. How Pat is related to Tat ?
A) Father B) Grandfather
C) Mother D) Grandmother

50. Shirin went to a bakery and bought items worth Rs. 25, out of which 30 paise went on sales tax on taxable purchases. If the tax rate was 6%, then what was the cost of the tax free items ?
A) Rs. 12 B) Rs. 19.70
C) Rs. 19.10 D) Rs. 18.80

SPACE FOR ROUGH WORK

51. The rate of simple interest on a sum of money is 6 per cent per annum for the first 3 years, 8 per cent per annum for the next 5 years and 10 per cent per annum for the period beyond 8 years. If the simple interest accrued by the sum for a total period of 10 years is Rs. 1,560, what is the sum ?

A) Rs. 1,500
B) Rs. 3,000
C) Rs. 2,000
D) Data Inadequate

52. Adrian starts a start-up with a capital of Rs. 85,000. Brian joins in the start-up with Rs. 42,500 after sometime. For how much period does Brian join, if the profits at the end of the year are divided in the ratio of 3 : 1 ?

A) 5 months B) 6 months
C) 7 months D) 8 months

53. A car travels at an average of 50 miles per hour for 2.5 hours and then travels at a speed of 70 miles per hour for 1.5 hours. How far did the car travel in the entire 4 hours ?

A) 210 miles B) 230 miles
C) 250 miles D) 260 miles

54. By selling 45 limes for Rs. 40, a woman loses 20%. How many should she sell for Rs. 24 to gain 20 % in the transaction ?

A) 16 B) 18
C) 20 D) 22

55. The prestigious Ramon Magsaysay Award was conferred upon Ms. Kiran Bedi for her excellent contribution to which of the following fields ?

A) Literature
B) Community Welfare
C) Government Service
D) Journalism

56. Who among the following is not a recipient of 'Dada Saheb Phalke' Award ?

A) Ramanand Sagar
B) Raj Kapoor
C) V. Shantaram
D) Ashok Kumar

57. What is part of a database that holds only one type of information ?

A) Report B) Field
C) Record D) File

58. '.JPG' extension refers usually to what kind of file ?

A) System file
B) Animation/movie file
C) MS Encarta document
D) Image file

59. Which of the following is not written by Munshi Premchand ?

A) Gaban B) Godan
C) Guide D) Manasorovar

60. The famous Dilwara Temples are situated in

A) Uttar Pradesh B) Rajasthan
C) Maharashtra D) Madhya Pradesh

SPACE FOR ROUGH WORK

PART – B

61. A decimal has 25 digits. The number of bits needed for its equivalent binary representation is approximately,

A) 50 B) 74
C) 40 D) 60

62. Which of the following is minimum error code?

A) Octal code B) Binary Code
C) Gray Code D) Excess-3 code

63. Match list I with List II and select the correct answer using the codes given below the lists.

List I	List II
A. 0-address instruction	1. T = TOP (T – 1)
B. 1-address instruction	2. Y = Y + X
C. 2-address instruction	3. Y = A – B
D. 3-address instruction	4. ACC = ACC – X

Codes :

	A	B	C	D
A)	1	2	3	4
B)	3	2	4	1
C)	2	3	1	4
D)	1	4	2	3

64. If a processor has 32-bit virtual address, 28-bit physical address, 2 kb pages. How many bits are required for the virtual, physical page number ?

A) 17, 21 B) 21, 17
C) 6, 10 D) None

65. A binary search tree contains the values - 1, 2, 3, 4, 5, 6, 7 and 8. The tree is traversed in preorder and the values are printed out. Which of the following sequences is a valid output ?

A) 5 3 1 2 4 7 8 6 B) 5 3 1 2 6 4 9 7
C) 5 3 2 4 1 6 7 8 D) 5 3 1 2 4 7 6 8

66. The question is based on the following program fragment.

```
f (int Y[10], int x){
int u, j, k;
i = 0; j = 9;
do {
        k = (i+j) / 2;
        if (Y[k] < x)   i = k;   else j = k;
} while ( (Y[k] != x) && (i< j) );
if (Y[k] == x)  printf ("x is in the array.");
else printf ("x is not in the array.");
}
```

On which of the following contents of 'Y' and 'x' does the program fail ?

A) Y is [1 2 3 4 5 6 7 8 9 10] and x < 10
B) Y is [1 3 5 7 9 11 13 15 17 19] and x < 1
C) Y is [2 2 2 2 2 2 2 2 2 2] and x > 2
D) Y is [2 4 6 8 10 12 14 16 18 20] and 2 < x < 20 and 'x' is even

67. The number of the edges in a regular graph of degree 'd' and 'n' vertices is

A) Maximum of n, d
B) n + d
C) nd
D) nd / 2

SPACE FOR ROUGH WORK

68. Consider the following C code segment :

```
int Ls Prime (n)
{
int i, n;
for (i=2; i<= sqrt(n); i++)
if (n % i == 0)
{
printf ("Not Prime.\n");
return 0;
        }
return 1;
}
```

Let T(n) denote the number of times the *for* loop is executed by the program on input *n*. Which of the following is true ?

A) $T(n) = O(\sqrt{n})$ and $T(n) = \Omega(\sqrt{n})$

B) $T(n) = O(\sqrt{n})$ and $T(n) = \Omega(1)$

C) $T(n) = O(n)$ and $T(n) = \Omega(\sqrt{n})$

D) None of these

69. A language L for which there exists a TM 'T', that accepts every word in L and either rejects or loops for every word that is not in L, is said to be

A) Recursive
B) Recursively enumerable
C) NP-HARD
D) None of the above

70. Consider an ε-tree CFG. If for every pair of productions $A \rightarrow u$ and $A \rightarrow v$

A) If FIRST (u) $\cap$ FIRST (v) is empty then the CFG has to be LL(1)
B) If the CFG is LL(1) then FIRST (u) $\cap$ FIRST (v)has to be empty
C) Both (A) and (B)
D) None of the above

71. Synthesized attribute can easily be simulated by an

A) LL grammar
B) ambiguous grammar
C) LR grammar
D) none of the above

72. The logic of pumping lemma is a good example of

A) the pigeon-hole principle
B) the divide and conquer technique
C) recursion
D) iteration

73. Given relations R(w, x) and S(y, z), the result of
SELECT DISTINCT w,x from R,S

A) R has no duplicates and S is non-empty
B) R and S have no duplicates
C) S has no duplicates and R is non-empty
D) R and S has the same number of tuples

74. E-R model uses this symbol to represent weak entity set ?

A) Dotted rectangle
B) Diamond
C) Doubly outlined rectangle
D) None of these

75. By open domain CASE tools we mean

A) tools available in open domain
B) software packages which can be downloaded from the internet
C) software packages to aid each phase of the systems analysis and design which can be downloaded free of cost from the internet
D) source codes of CASE tools

76. If P is risk probability, L is loss, then Risk Exposure (RE) is computed as·

A) RE = P/L B) RE = P + L
C) RE = P*L D) RE = 2* P *L

SPACE FOR ROUGH WORK

77. A can is filled with 5 paise coins. Another can is filled with 10 paise coins. Another can is filled with 25 paise coins. All the cans are given wrong labels. If the can labeled 25 paise is not having the 10 paise coins, what will the can, labeled 10 paise have?
A) 25 paise
B) 5 paise
C) 10 paise
D) Cannot be determined

78. What is the maximum value of the function $f(x) = 2x^2 - 2x + 6$ in the interval [0,2] ?
A) 6 B) 10
C) 12 D) 5, 5

79. The value of the Integral $I = \int_0^{\pi/2} x^2 \sin x \, dx$ is
A) (x+2)/2 B) $2/(\pi - 2)$
C) $\pi - 2$ D) $\pi + 2$

80. The possible number of Boolean function of 3 variables X,Y and Z such that
$f(X, Y, Z) = f(X', Y', Z')$
A) 8 B) 16
C) 64 D) 32

81. What is the modality of relationship, if there is no explicit need for relationship to occur ?
A) Zero B) Two
C) Three D) One

82. If the original size of data is 40 then after adding error detection redundancy bit the size of data length is
A) 26 B) 36
C) 46 D) 56

83. Which of the following would not be specified in a communication protocol ?
A) Header contents
B) Trailer contents
C) Error Checking
D) Data content of message

84. Bit stuffing refers to
A) Inserting a '0' in user data stream to differentiate it with a flag
B) Inserting a '0' in flag stream to avoid ambiguity
C) Appending a nibble to the flag sequence.
D) Appending a nibble to the user data stream

85. A micro programmed control unit
A) Is faster than a hardwired unit
B) Facilitates easy implementation of a new instruction
C) Is useful when small programs are to be run
D) All of the above

86. If the channel is band limited to 6 kHz and signal to noise ratio is 16, what would be the capacity of channel ?
A) 16.15 kbps B) 23.24 kbps
C) 40.12 kbps D) 24.74 kbps

87. At 100% modulation, the power in each sideband is _____ of that of carrier.
A) 50% B) 40%
C) 60% D) 25%

88. The capacity relationship is given by
A) C = W log2 (1 + S/N)
B) C = 2W log2 (1 + S/N)
C) C = W log2 (1 – S/N)
D) C = W log10 (1 + S/N)

SPACE FOR ROUGH WORK

89. Which of the following algorithm solve the all-pair shortest path problem ?

A) Dijakstra's algorithm
B) Floyd's algorithm
C) Prim's algorithm
D) Warshall's algorithm

90. An algorithm is made up of two modules M1 and M2. If order of M1 is f(n) and M2 is g(n) then he order of algorithm is

A) max (f(n), g(n))
B) min(f(n), g(n))
C) f(n) + g(n)
D) f(n) x g(n)

91. Which of the following definitions generates the same languages as L, where
$L = \{ x^n y^n, n >= 1 \}$

i. $E \rightarrow x\ Ey \mid xy$
ii. $xy \mid x^+xyy^+$
iii. x^+y^+

A) (i) only
B) (i) and (ii) only
C) (ii) and (iii) only
D) (ii) only

92. Choose the correct statements.

A) A total recursive function is also a partial recursive function.
B) A partial recursive function is also a total recursive function.
C) A partial recursive function is also a primitive recursive function.
D) None of the above

93. The address sequence generated by tracing a particular program executing in a pure demand paging system with 100 records per page, with 1 free main memory frame is recorded as follows. What is the number of Page Faults ?
0100, 0200, 0430, 0499, 0510, 0530, 0560, 0120, 0220, 0240, 0260, 0320, 0370.

A) 15, 4 B) 6, 4
C) 7, 2 D) 4, 6

94. Assume transaction A holds a shared lock R. If transaction B also requests for a shared lock on R. It will

A) result in deadlock situation
B) immediately be granted
C) immediately be rejected
D) be granted as soon as it is released by A

95. Disk request come to a disk driver for cylinders in the order 10,22,20,2,40,6 and 38, at a time when the disk drive is reading from cylinder 20. The seek time is 6 ms per cylinder. The total seek time , if the disk arm scheduling algorithm is first-come-first-served is

A) 900 ms B) 850 ms
C) 360 ms D) 876 ms

96. Table employees has 10 records. It has a non-NULL SALARY column which is also UNIQUE. The SQL statement

```
SELECT COUNT(*)
FROM EMPLOYEE
WHERE SALARY > ALL (SELECT
SALARY FROM EMPLOYEE);
```

A) 10 B) 9
C) 5 D) 0

SPACE FOR ROUGH WORK

PART – C

97. Which level of RAID refers to disk mirroring with block striping ?

A) RAID level 1

B) RAID level 2

C) RAID level 0

D) RAID level 3

98. Which of the following is not a form of main memory ?

A) Instruction cache

B) Instruction register

C) Instruction opcode

D) Translation look-aside buffer

99. The following program fragment prints
int i = 5;
do { putchar(i+100); printf ("%d", i– –;) }
while (i);

A) i5h4g3f2el

B) 14h3g2f1e0

C) An error message

D) None of the above

100. The running time of an algorithm T(n), where 'n' is the input size, is given by

$T(n) = 8T(n/2) + qn$, if $n > 1$

$= p$, if $n = 1$

Where p, q are constants. The order of this algorithm is

A) n^2

B) n^n

C) n^3

D) n

101. Which of the following is a desirable property of module ?

A) Independency

B) Low cohesiveness

C) High coupling

D) Multifunctional

102. The solution of the recurrence relation $a_r = a_{r-1} + 2a_{r-2}$ with $a_0 = 2$, $a_1 = 7$ is

A) $a_r = (3)^r + (1)^r$

B) $2a_r = (2)^r/3 - (1)^r$

C) $a_r = 3^{r+1} - (-1)^r$

D) $a_r = 3(2)^r - (-1)^r$

SPACE FOR ROUGH WORK

103. The convergence of the bisection method is

A) Cubic

B) Quadratic

C) Linear

D) None

104. In a ripple counter using edge-triggered JK flip-flops, the pulse input is applied to

A) Clock input of all flip-flops

B) J and K input of one flip-flop

C) J and K input of all flip-flops

D) Clock input of one flip-flop

105. M is a square matrix of order 'n' and its determinant value is 5. If all the elements of M are multiplied by 2, its determinant value becomes 40. The value of 'n' is

A) 2

B) 3

C) 5

D) 4

106. When transaction Ti requests a data item currently held by Tj , Ti is allowed to wait only if it has a timestamp smaller than that of Tj (that is, Ti is older than Tj). Otherwise, Ti is rolled back (dies). This is

A) Wait-die

B) Wait-wound

C) Wound-wait

D) Wait

107. What will be the output of following ?

```
main( )
{
        Static int a = 3;
        Printf("%d",a--);
        If (a)
        main( );
}
```

A) 3

B) 3 2 1

C) 3 3 3

D) Program will fall in continuous loop and print 3

108. Web links are stored within the page itself and when you wish to 'jump' to the page that is linked, we select the hotspot or anchor. This technique is called

A) Hypertext

B) Hypermedia

C) Both (A) and (B)

D) Anchoring

SPACE FOR ROUGH WORK

PART – D

109. Twelve 1 Ω resistances are used as edges to form a cube. The resistance between two diagonally opposite corners of the cube is

A) $\frac{5}{6}\ \Omega$

B) $\frac{1}{6}\ \Omega$

C) $\frac{6}{5}\ \Omega$

D) $\frac{3}{2}\ \Omega$

110. An ideal op-amp is an ideal

A) voltage controlled current source

B) voltage controlled voltage source

C) current controlled current source

D) current controlled voltage source

111. The final value theorem is used to find the

A) Steady state value of the system output

B) Initial value of the system output

C) Transient behavior of the system output

D) None of these

112. For the discrete signal $x[n] = a^n u[n]$, $a > 0$ the z-transform is

A) $\frac{(z+a)}{z}$

B) $\frac{(z-a)}{z}$

C) $\frac{z}{(z-a)}$

D) $\frac{z}{(z+a)}$

113. For a periodic signal $v(t) = 30 \sin 100t + 10 \cos 300t + 6 \sin (500t + \pi/4)$, the fundamental frequency in rad/s

A) 100

B) 300

C) 500

D) None of these

114. A solution for the differential equation $x'(t) + 2x(t) = \delta(t)$ with initial condition $x(\bar{0}) = 0$

A) $e^{-2t} u(t)$

B) $e^{2t} u(t)$

C) $e^{-t} u(t)$

D) $e^{t} u(t)$

115. If the number of bits per sample in a PCM system is increased from a n to n+1, the improvement in signal to quantization nose ratio will be

A) 3 dB B) 6 dB

C) 2n dB D) n dB

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116. A carrier AcCos(ωc)t is frequency modulated by a signal EmCos(ωm)t.The modulation index is mf. The expression for the resulting FM signal is

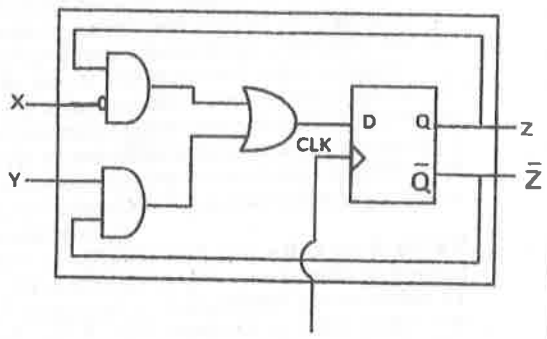
A) AcCos[ωct + mfSin(ωm)t]

B) AcCos[ωct + mfCos(ωm)t]

C) AcCos[ωct + πmfSin ωmt]

D) AcCos[ωct + 2πmfEm Cos(ωm)t/ωm]

117. A sequential circuit using D flip-flop and logic gates is shown in Figure, where X and Y are the inputs and Z is the output. The circuit is



A) S – R Flip-Flop with inputs X = R and Y = S

B) S – R Flip-Flop with inputs X = S and Y = R

C) J – K Flip-Flop with inputs X = J and Y = K

D) J – K Flip-Flop with inputs X = K and Y = J

118. A 4 bit ripple counter and a 4 bit synchronous counter are made using flip-flops having a propagation delay of 10 ns each. If the worst case delay in the ripple counter and the synchronous counter be R and S respectively, then

A) R = 10 ns, S = 40 ns

B) R = 40 ns, S = 10 ns

C) R = 10 ns, S = 30 ns

D) R = 30 ns, S = 10 ns

119. In MOSFET fabrication,the channel length is defined during the process of

A) Isolation oxide growth

B) Channel stop implantation

C) Poly-silicon gate patterning

D) Lithography step leading to the contact pad

120. The open-loop transfer function of a feedback control system is $G(s).H(s) = 1/(s+1)^3$ .The gain margin of the system is

A) 2

B) 4

C) 8

D) 16

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