1. An amplifier has three stages for which T_{e1} = 150 K (first stage), T_{e2} = 350 K and T_{e3} = 600 K (output stage): Available power gain of the first stage is 10 and overall input effective noise temperature is 190 K. The available power gain of the second stage is _____.

(A) 12 (B) 14 (C) 16 (D) 18

2. The root of equation $x^3 - 4x - 9 = 0$ using the bisection method in four stages for $x \in [2, 3]$ is :

(A) 2.7065 (B) 2.6875 (C) 2.750 (D) None of the above

3. For CT-LTI systems, consider S1 and S2 statements.

S1 : There is no BIBO stable system with a pole in the right half of the complex plane.

S2 : There is non-causal and BIBO stable system with a pole in the right half of the complex plane.

State which one among the following is correct ?

(A) Both S1 and S2 are true (B) Both S1 and S2 are false

(C) Only S2 is true (D) Only S1 is true

4. Which of the following are the components of WiMax ?

(A) SS/MS (B) ASN (C) BS (D) All the above

5. A combinational network has four inputs (A, B, C, D) and one output (F). The output is zero if and only if three or four of the inputs are '0'. The maxterm expansion of F is :

(A) $F = \prod M(0,1,2,4,8)$ (B) $F = \sum m(0,1,2,3,4,5,6,8,10,12)$

(C) $F = \prod M(7,11,13,14,15)$ (D) $F = \prod m(7,11,13,14,15)$

. Which is not an application of artificial intelligence ?

(A) Face recognition system (B) Chatbots

(C) LIDAR (D) DBMS

. Most of the weather radars use _____.

(A) circular polarization (B) linear polarization

(C) horizontal polarization (D) vertical polarization

8. Which one does not belong to TDMA standard of second-generation networks ?

(A) GSM (B) IS - 136 (C) AMPS (D) PDC

9. Match the items in first column with the items in the second column.

(1)	Indirect Addressing	(X)	Array implementation
(2)	Indexed Addressing	(Y)	Writing re-locatable code
(3)	Base Register Addressing	(Z)	Passing array as parameter

(A) (1) - (Z), (2) - (X), (3) - (Y)
(B) (1) - (Y), (2) - (Z), (3) - (X)
(C) (1) - (Z), (2) - (Y), (3) - (X)
(D) (1) - (X), (2) - (Z), (3) - (Y)

10. The handoff takes place in Mobile Assisted Handoff, when :
(A) The power received by the mobile station from other base station is more than the serving base station
(B) The channel allocated is not available
(C) The mobile station has no signal
(D) All of the above

11. Match the following :

	Column 1		Column 2
(1)	Electron Microscope	(W)	Electron Gun
(2)	Oscilloscope	(X)	Condensing magnetic lens
(3)	Galvanometric recorder	(Y)	Recording head
(4)	Magnetic recorder	(Z)	Derive motor

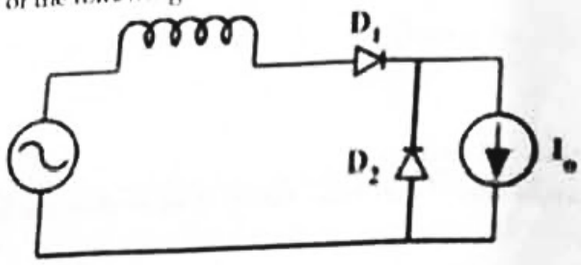
(A) (1) - (W), (2) - (X), (3) - (Y), (4) - (Z)
(B) (1) - (Z), (2) - (Y), (3) - (X), (4) - (W)
(C) (1) - (X), (2) - (W), (3) - (Z), (4) - (Y)
(D) (1) - (Y), (2) - (W), (3) - (Z), (4) - (X)

12. The disadvantages of an optical feedback trans impedance receiver are :
(1) Increase in receiver input capacitance
(2) Increase in dark current
(3) Decrease in receiver input capacitance
(4) Decrease in dark current
(A) both (1) and (2)
(B) both (2) and (3)
(C) both (3) and (4)
(D) both (1) and (4)

13. Kepler's second law states _____.
(A) If $t_2 - t_1 = t_4 - t_3$, then $A_{12} = A_{34}$.
(B) If $t_2 + t_1 = t_4 + t_3$, then $A_{12} = A_{34}$.
(C) If $t_2/t_1 = t_4/t_3$, then $A_{12} = A_{34}$.
(D) None of the above

14. In an OSI reference model, which layer provides physical address to each machine ?
(A) Physical layer (B) Data Link Layer (C) Network Layer (D) Transport Layer

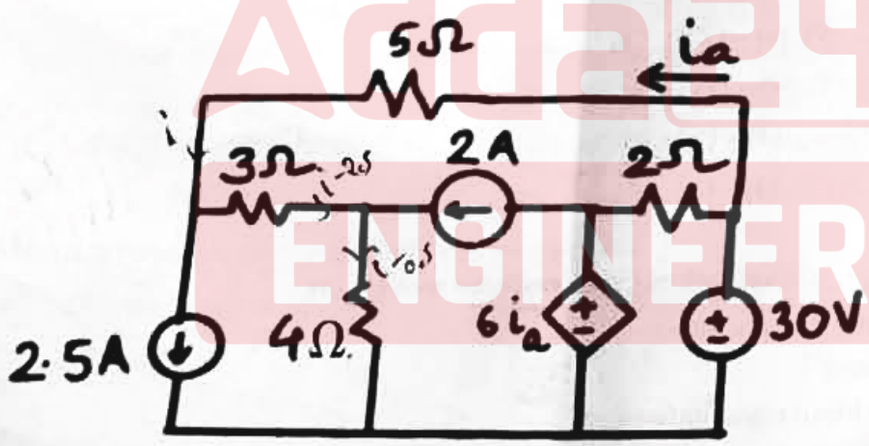
15. In the following circuit, assume the diodes are ideal, the inductance is small, and $I_0 \neq 0$. Which one of the following statements is true ?



(A) D_1 conducts for greater than 180° and D_2 conducts for greater than 180°
(B) D_2 conducts for more than 180° and D_1 conducts for 180°
(C) D_1 conducts for 180° and D_2 conducts for 180°
(D) D_1 conducts for greater than 180° and D_2 conducts for 180°

16. The minimum doppler shift is _____.
(A) zero (B) double of transmitter frequency
(C) transmitter frequency (D) half of transmitter frequency

17. In the following circuit, the power dissipation in the 2 Ω resistor is :



(A) 76.4 W (B) 52.5 W (C) 305.6 W (D) 210.0 W

pipelined processor's performance deteriorates if :
) The pipelined stages are with different delays
Consecutive instructions depend on each other
Hardware resources are shared by pipeline stages
All of the above

19. If the path difference of two waves with single source travelling by different paths to arrive at the same point, is $\lambda/2$, what would be the phase difference between them ?

(A) $\beta + (\lambda/2)$ (B) $\beta \times (\lambda/2)$ (C) $\beta - (\lambda/2)$ (D) $\beta / (\lambda/2)$

20. If in a rectangular waveguide for which $a = 2b$, the cut-off frequency for TE_{02} mode is 12 GHz, the cut-off frequency for TM_{11} mode is :

(A) 3 GHz (B) $3\sqrt{5}$ GHz (C) $6\sqrt{5}$ GHz (D) 12 GHz

21. Which option is true regarding the number of computations required to compute DFT at any one value of 'k' ?

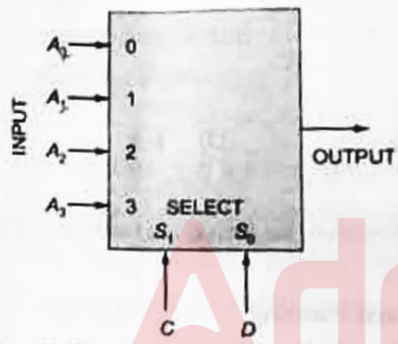
(A) 4N – 2 real multiplications and 4N real additions

(B) 4N real multiplications and 4N – 4 real additions

(C) 4N – 2 real multiplications and 4N + 2 real additions

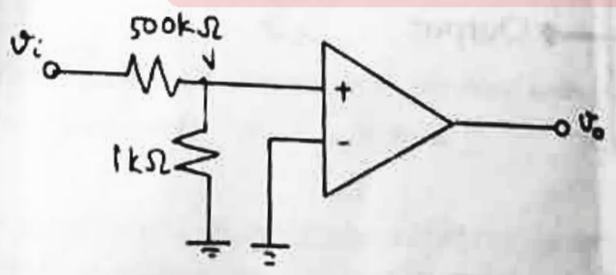
(D) 4N real multiplications and 4N – 2 real additions

22. Consider the 2-bit multiplexer (MUX) shown in the figure. The output to be the XOR of C and D, The value of A_0 and A_1 are _____.



(A) 0, 0 (B) 1, 0 (C) 0, 1 (D) 1, 1

23. For the circuit shown below the output voltage is $v_o = 2.5$ V in response to input voltage $v_i = 5$ V. The finite open-loop differential gain of the op-amp is :



$V = \frac{1 \times V_i}{500}$

$V = \frac{V_i}{500}$

$V_0 = (V - 0) A_V$

$2.5 = \frac{5}{500} \times A_V$ $A_V = \frac{2.5 \times 500}{5} = 250$

(A) 5×10^4 (B) 2×10^4 (C) 250.5 (D) 501

24. In a dispersive medium, the group velocity is :

(A) Less than the phase velocity only

(B) Equal to the phase velocity only

(C) More than the phase velocity, depending on the nature of the dispersive medium

(D) More than the phase velocity

25. The first geostationary satellite launched in 1965 was called _____.

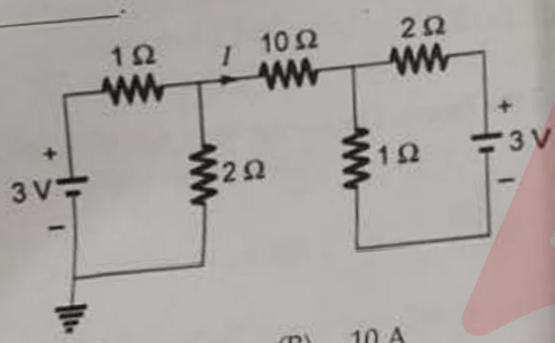
(A) EARLY BIRD (Intelsat-I)

(B) ANIK

(C) WESTAR

(D) MOLNIYA

26. Consider the circuit shown in the figure. The current I flowing through the 10 Ω resistor is _____.



(A) 0 A

(B) 10 A

(C) 0.1 A

(D) 1 A

27. You are given reviews of few netflix series marked as positive, negative and neutral. Classifying reviews of a new netflix series is an example of _____.

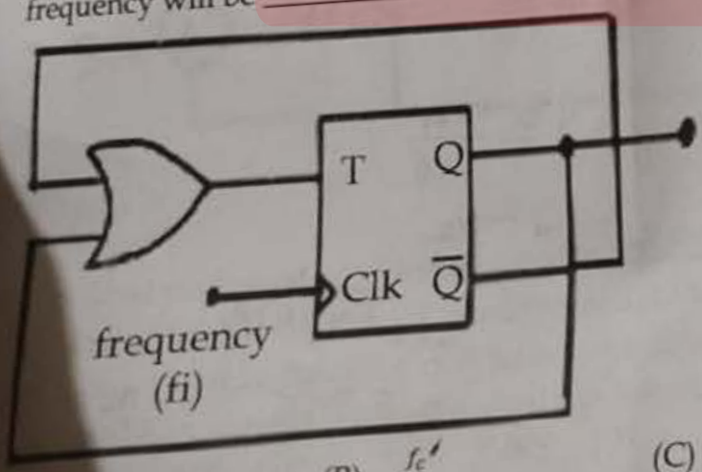
(A) supervised learning

(B) unsupervised learning

(C) semisupervised learning

(D) reinforcement learning

28. Initially the flip flop is cleared in the following circuit. If input clock frequency is f_c, then output frequency will be _____.



(A) $2f_c$

(B) $\frac{f_c}{2}$

(C) $4f_c$

(D) will be same as input

29. Consider a discrete time signal :

$x[n] = 0.2x_t[n - n_0] - 2$

A discrete transformed signal of $x[n]$ is given by,

$x_t[n] = 5x[n + n_0] + K$

The value of constant K is :

(A) -2 (B) 10 (C) -5 (D) -10

30. Three statistically independent random variables X_1, X_2 and X_3, have mean values $\overline{X_1} = 3, \overline{X_2} = 6,$ and $\overline{X_3} = -2$. The mean values of $g(X_1, X_2, X_3) = X_1 + 3X_2 + 4X_3$ is :

(A) 13 (B) 29 (C) 1 (D) 0

31. At which layer, SONET regenerators do function ?

(A) OSI model layer (B) Data link layer

(C) Physical layer (D) Network layer

32. The 'ORG O' instruction's type is :

(A) Pseudo instruction (B) High level instruction

(C) Machine instruction (D) Memory instruction

33. The one advantage of setting up a DMZ with two firewalls is that :

(A) You can control where traffic goes in three networks

(B) You can do stateful packet filtering

(C) You can do load balancing

(D) Improved network performance

34. The entropy of a message source generating four messages with probabilities 0.5, 0.25, 0.125 and 0.125 is _____.

(A) 1.0 bits/message (B) 3.32 bits/ message

(C) 1.75 bits/ message (D) 5.93 bits/ message

35. Transmission and reception both are done using the same antenna in _____ radar.

(A) Monostatic (B) Bistatic (C) Monopole (D) Dipole

36. A phase-controlled, single-phase, full-bridge converter is fed from a 230 V, 50 Hz, AC source. The fundamental frequency in Hz of the voltage ripple on the DC side is _____.

(A) 100 (B) 25 (C) 50 (D) 300

37. _____ type of duplex communication is used by a mobile phone.

(A) Half (B) Full

(C) Zero (D) Both (A) and (B)

38. Epitaxial growth is used in integrated circuit :

(A) Because it produces low parasitic capacitance

(B) Because it yields back-to-back isolating junctions

(C) To grow single crystal n-doped silicon on single-crystal p-type substrate

(D) To grow selectively single-crystal p-doped silicon of one resistivity on p-type substrate of a different resistivity.

39. The frequency for satellite communication should be _____.

(A) more than the critical frequency (B) less than the critical frequency

(C) equal to the critical frequency (D) none of the above

40. The subsystem responsible for radio transmission between mobile station and MSC is _____.

(A) BSS (B) NSS (C) OSS (D) BSC

41. An AWGN channel has a bandwidth of 1 MHz, power of 10 W and noise power spectral density of $\eta/2=10^{-9}$ W/Hz. The capacity of channel is :

(A) 29.46 kbps (B) 21.43 kbps (C) 16.47 kbps (D) 13.29 kbps

42. Which of the following relations are true if $x(n)$ is real ?

(A) $X(\omega) = X(-\omega)$ (B) $X(\omega) = -X(-\omega)$

(C) $X^*(\omega) = X(\omega)$ (D) $X^*(\omega) = X(-\omega)$

43. Find the inverse Laplace transform of $\frac{s}{(s^2+4)^2}$.

(A) $1/4 \sin(2t)$ (B) $t^2/4 \sin(2t)$ (C) $t/4 \sin(2t)$ (D) $t/4 \sin(2t^2)$

Consider the following operations :

(i) Passing $x(-n)$ through a digital filter $H(z)$

(ii) Time reversing the output of $H(z)$

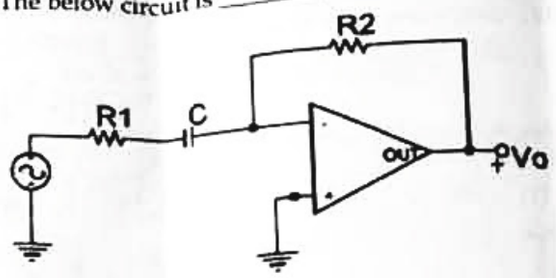
(iii) Time reversal of the input signal $x(n)$

(iv) Passing the result through $H(z)$

The correct order of operations to be performed in order to realize linear phase IIR filter is :

(A) (i), (ii), (iii), (iv) (B) (iii), (i), (ii), (iv) (C) (ii), (iii), (iv), (i) (D) (i), (iii), (iv), (ii)

45. The below circuit is _____ filter.



(A) Band pass (B) High pass (C) Low pass (D) Band stop

46. An analog signal is band-limited to 4 kHz, sampled at the Nyquist rate and the samples are quantized into 4 levels. The quantized levels are assumed to be independent and equally probable. If we transmit two quantized samples per second, the information rate is :

(A) 2 bit / sec (B) 3 bit / sec (C) 4 bit / sec (D) 6 bit / sec

47. Unauthorised access of information from a wireless device through a bluetooth connection is called _____.

(A) bluemaking (B) bluesnarfing (C) bluestring (D) bluescoping

48. The high voltage capacitor and high value inductance can be respectively measured by :

(A) Schering bridge, Hay's bridge

(B) Heaviside bridge, Anderson bridge

(C) Hay's bridge, Schering bridge

(D) Anderson bridge, Heaviside bridge

49. The core diameter of a multimode step-index fiber is 80 μm and its relative index difference is 1.5%, operating at a wavelength of 0.85 μm. What will be the normalized frequency for the fiber if the core refractive index is 1.48 ?

(A) 37.9 (B) 75.8 (C) 151.6 (D) 303.2

50. A TDM link has 20 signal channels and each channel is sampled at 7 kHz. If each sample is represented by 8 bits and contains an additional bit for synchronization, find the total bit rate for the TDM link ?

(A) 695 kbps (B) 888 kbps (C) 1260 kbps (D) 1209 kbps

51. In an electrically small loops, the overall length of the loop is _____ one-tenth of a wavelength.

(A) less than (B) equal to (C) greater than (D) none of the above

52. The change in collector voltage is from 1 V to 3 V while the v_{BE} remains constant. If the collector current change is restricted to be less than 5%; what is the value of necessary early voltage ?

(A) $V_A > 39$ V (B) $V_A < 39$ V (C) $V_A > 26$ mV (D) $V_A < 26$ mV

53. Most common form of AC meters met with in everyday domestic and industrial installations are :

(A) Mercury motor meters

(B) Commutator motor meters

(C) Induction type single phase energy meters

(D) All of the above

54. A device employing INTR line for device interrupt puts the CALL instruction on the data bus while :

(A) $\overline{INTA}$ is active (B) HOLD is active

(C) READY is active (D) None of the above

55. Determine the final response on cascading two signals h(n) = {1, – 2, 3} and x(n) = {0, 0, 1, 1, 1, 1}.

(A) {1, – 2, 4, 1, 1, 1} (B) {0, 0, 1, – 1, 2, 2, 1, 3}

(C) {0, 0, 3} (D) {0, 0, 3, 1, 1, 1, 1}

56. Electric flux is a _____ field, and its density is a _____ field.

(A) vector, vector (B) vector, scalar (C) scalar, scalar (D) scalar, vector

57. The ratio of maximum displacement deviation to full scale deviation of the instrument is known as :

(A) Static sensitivity (B) Dynamic deviation

(C) Linearity (D) Precision or accuracy

The Asian Cellular System, utilizes one _____ covering the Asia Pacific area, an area of over 11 million square miles.

(A) Garuda MEO satellite (B) Garuda geosynchronous satellite

(C) Garuda LEO satellite (D) None of the above

inverse Laplace transform of $\frac{1}{s+1}$ is :

(C) 1 (D) e^{-1}

60. The advantages of FDMA over TDMA includes :

(1) Division is simpler

(2) Propagation delays are eliminated

(3) Linearity

(4) Cheaper filters with less complicated logic functions

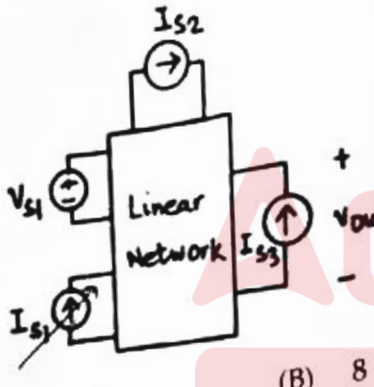
(A) (1), (2) and (3) are correct (B) (1) and (2) are correct

(C) (1) and (4) are correct (D) All four are correct

61. The value of the total length field in bytes (IPv4 packet with header length 224 bits and data length 3200 bits) is _____.

(A) 428 (B) 407 (C) 107 (D) 427

62. In the following linear circuit, three sources have fixed value, only I_{s1} can be varied. It is given that if I_{s1} = 3 mA then V_{out} = 16 V and if I_{s1} = 1 mA then V_{out} = 8 V. If I_{s1} = 0.5 mA, then the value of V_{out} is :



(A) 6 V (B) 8 V (C) 4 V (D) 12 V

63. The correct steps for the OVPO fiber fabrication process are :

(A) Soot perform, perform sintering, soot deposition, fiber drawing

(B) Soot deposition, soot preform, preform sintering, fiber drawing

(C) Fiber drawing, soot perform, perform sintering, soot deposition

(D) Soot perform, soot deposition, perform sintering, fiber drawing

64. In a non-isotropic directional antenna, which radiating lobe axis makes an angle of 180° w.r.t. major beam of an antenna ?

(A) Minor lobe (B) Side lobe (C) Back lobe (D) None of the above

65. $z = \sqrt{x^2 + y^2}$ and $x^3 + y^3 + 3axy = 5a^2$, then at $x = a, y = a, \frac{dz}{dx}$ is equal to :

(A) $2a$ (B) $\sqrt{2}$ (C) $2a^2$ (D) a^3

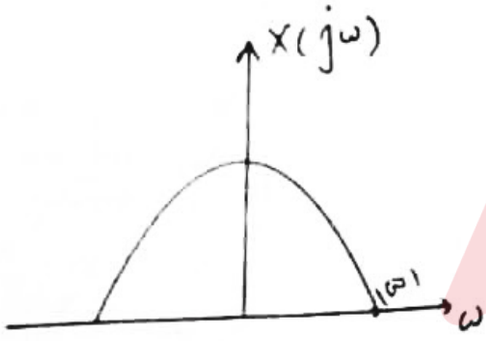
66. What is the set of all values of z for which X(z) attains a finite value ?

(A) Radius of convergence
(B) Radius of divergence
(C) Feasible solution
(D) None of the mentioned

67. A Random variable X is uniformly distributed on the interval (−5, 15). Another random variable $Y = e^{-\frac{X}{5}}$ is formed. The value of E[Y] is :

(A) 2.967 (B) 0.667 (C) 1.387 (D) 2

68. Below figure shows Fourier spectra of signal $x(t)$. The bandwidth of $x(t)$ is given as 100 kHz. Determine Nyquist sampling rate for $x^2(t)$.



(A) 100 kHz (B) 150 kHz (C) 250 kHz (D) 400 kHz

69. The _____ layer uses data compression to reduce the number of bits to be transmitted.

(A) presentation
(B) network
(C) data link
(D) application

70. There is an Ethernet port on the router were assigned an IP address of 172.16.112.1/25. Which would be the valid subnet address for this host ?

(A) 172.16.112.0
(B) 172.16.96.0
(C) 172.16.0.0
(D) 172.16.255.0

71. A 4 × 16 decoder may be constructed using _____ 2 × 4 decoders.

(A) Four (B) Five (C) Six (D) Three

72. A network Bridge device connects two or more networks to form a _____ LAN network.

(A) Single (B) Duplicate (C) Multi (D) None

73. Highest harmonic is 20 kHz in an analog data. The data has been digitized using 6 level PCM. Find the rate at which digital signal generated ?

(A) 240 kbps (B) 120 kbps (C) 60 kbps (D) 40 kbps

74. In File Transfer Protocol, data transfer cannot be done in _____.
(A) stream mode (B) block mode
(C) compressed mode (D) message mode

75. A pulse radar is operating at 10 GHz frequency has an antenna with a gain of 28dB and a transmitted power of 2 kW. If desired to detect a target of cross section 12 m^2, and the minimum detectable signal is -90 dBm, the maximum range of the radar is :
(A) 8114 m (B) 2348 m (C) 1256 m (D) 4563 m

76. A solenoid has 4000 turns over it with inductance of 0.126 H. The energy stored in the magnetic field, when a current of 2 A flows in the solenoid will be :
(A) 0.252 J (B) 8000 J (C) 0.504 J (D) 400 J

77. A DC series motor is driven by a chopper circuit. The supply voltage is 220 V and the duty cycle is 25%. Determine the DC voltage applied to the motor.
(A) 55 V (B) 165 V (C) 110 V (D) 220 V

78. The orbital spacing is _____ for the high-power satellites, so adjacent satellite interference is considered nonexistent.
(A) 18° (B) 9° (C) 27° (D) 36°

79. For an AM signal, the bandwidth is 10 kHz and the highest frequency component present is 705 kHz. The carrier frequency used for this AM signal is _____.
(A) 695 kHz (B) 700 kHz (C) 705 kHz (D) 710 kHz

80. Consider a machine with 10 ns clock and it takes 4 clock cycle per ALU instruction, 5 clock cycle per branch instruction, 6 clock cycle memory instruction. There exists 40% ALU instruction, 20% branch instruction and 40% memory instruction.
What is throughput of pipeline system if overhead is 2ns ?
(A) 83 MIPS (B) 84 MIPS (C) 85 MIPS (D) 86 MIPS

81. 7, 9, 13, 21, 37, ?
(A) 58 (B) 63 (C) 69 (D) 72

82. If 'VEHEMENT' is written as 'VEHETNEM' then how 'MOURNFUL' be written in that code language ?
(A) MOUNULER (B) OURMNFUL (C) MOURLUFN (D) URNFULMO

83. If 'NEUROTIC' can be written as 'TICRONEU' then how can 'PSYCHOTIC' be written ?
(A) TICCHOPSY (B) TICCOHPSY (C) TICHCOPSY (D) TICOCHPSY

(A) Water : Tap (B) Ear : Face (C) Power : Battery (D) Error : Omission

85. Bus : Driver then :

(A) Machine : Operator (B) War : Soldier

(C) Class : Student (D) Cook : Kitchen

86. 64 : 52 :: 81 : ?

(A) 53 (B) 72 (C) 65 (D) 63

87. In the following question, * stands for any of the mathematical signs at different places, which are given as choices under each question. Select the choice with the correct sequence of signs which when substituted makes the question as a correct equation.

24 * 4 * 5 * 4

(A) × + = (B) = × + (C) + × = (D) = + +

88. If '+' means 'minus', '−', means 'multiply', '÷' means 'plus' and '×' means 'divide', then $10 \times 5 \div 3 - 2 + 3 = ?$

(A) 21 (B) 33 (C) 5 (D) 52

89. 149 : 238 :: 159 : ?

(A) 169 (B) 248 (C) 261 (D) 268

90. MHZ, NIW, OKT, PNQ, ?

(A) QQN (B) QRM (C) QRN (D) RRN

(Direction for questions 91 - 93) : In the following, three alternatives are same in a certain way out of four and so form a group. Find the odd word that does not belong to the group.

91. (A) eulogies (B) extol (C) exalt (D) ignominious

92. (A) Rubber (B) Cinchona (C) Cardamom (D) Chalk

93. (A) Hydrometer (B) Diameter (C) Barometer (D) Hygrometer

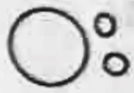
(Direction for questions 94 - 96) : In each of the following questions, four pairs of words are given, out of which the words in four pairs bear a certain common relationship. Choose the pair in which the words are differently related.

94. (A) Stale : Fresh (B) Truth : Lie (C) Teach : Learn (D) Slow : Sluggish

95. (A) Iron : Axe (B) Table : Wood (C) Jewelry : Gold (D) Shirt : Fabric

96. (A) Shovel : Mud (B) Screwdriver : Screw
(C) Hammer : Nail (D) Pen : Pencil

(Direction for questions 97 - 99) : Each of the questions below contains three elements. These three elements may or may not have some linkage. Each group of the elements may fit into one of the diagrams at (a), (b), (c), and (d). You have to indicate groups of elements in each of the questions which fit into which of the diagrams given below. The letter indicating the diagram is the answer.

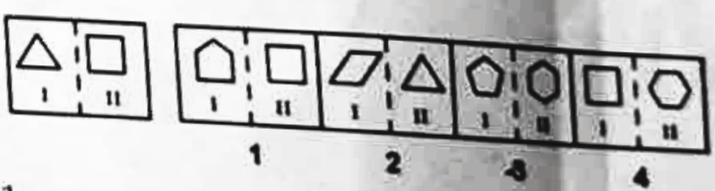
(a)  (b)  (c)  (d) 

97. Anxiety, Intelligence, Strength :
(A) (a) (B) (b) (C) (c) (D) (d)

98. Vegetables, Potato, Cabbage :
(A) (a) (B) (b) (C) (c) (D) (d)

99. Week, Day, Year :
(A) (a) (B) (b) (C) (c) (D) (d)

100. Given below is a related pair of figures (unnumbered) followed by four other pairs of figures numbered as 1, 2, 3, and 4. Out of the four pairs, select the pair that has a relationship similar to that in the un-numbered pair. The best answer is to be selected from a group of slightly close choices.



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

-oOo-