RESEARCH METHODOLOGY FOR ENGINEERING

1. A pot is fully filled (upto brims) with water. A cube of ice floating in it is partially submerged and partially seen above the water level. As the ice cube fully melts, what will happen to the level of water ?

(A) The water spills over

(B) The water level decreases

(C) The water level remains the same

(D) The water level increases

2. Suppose a 2-dimensional graph is to be plotted, with '*s*' as independent variable, '*p*' as dependent variable and also showing the impact of a 3rd variable, '*q*', on the '*p*' variable, then :

(A) independent variable, '*s*', is plotted along the *x*-axis; dependent variable, '*p*', is plotted along *y*-axis holding '*q*' constant, then other plots of '*s*' *vs.* '*p*' are done, each for a different value of '*q*' held constant.

(B) '*p*' is plotted along *x*-axis; '*s*' is plotted along *y*-axis holding '*q*' constant, then other plots of '*s*' *vs.* '*p*' are done, each for a different value of '*q*' held constant.

(C) '*s*' is plotted along *x*-axis; '*q*' is plotted along *y*-axis holding '*p*' constant, then other plots of '*q*' *vs.* '*s*' are done, each for a different value of '*p*' held constant.

(D) '*p*' is plotted along the *x*-axis; '*q*' is plotted along the *y*-axis holding '*s*' constant, then other plots of '*q*' *vs.* '*p*' are done, each for a different value of '*s*' held constant.

3. In a laboratory experiment, while plotting a graph,

(A) generally, 10 readings are taken, and a graph is plotted by connecting all the points plotted, even if it results in a zig-zag line.

(B) generally, 25 readings are taken, and a graph is plotted by connecting all the points plotted, even if it results in a zig-zag line.

(C) generally, 6 to 8 readings are taken, and a graph is plotted by connecting all the points plotted, even if it results in a zig-zag line.

(D) generally, 6 to 8 readings are taken, and a graph is plotted by drawing a smooth curve passing close to all points but may not touch all/several points.

4. The distinction between parameter and variable is :

(A) Parameter is an intrinsic property of the system and exists even if no input is applied to a system, while variable shows up only in response to applied input(s).

(B) Parameter is a fixed property of the system and exists even if no input is applied to a system, while variable is a variable quantity that shows up only in response to applied input(s).

(C) Parameter is a variable property of the system, while variable is a fixed property of the system.

(D) Parameter is a fixed property of the system and exists only if input is applied to a system, while variable is a variable property that shows up even if no input(s) is (are) applied.

5. In a class, the ratio of number of boys to girls is 5 : 3. What percentage of the students in the class are girls ?

(A) 37.5 %

(B) 50 %

(C) 60 %

(D) 62.5 %

6. If 25% of 260 equals 6.5% of P, what is P ?

(A) 65 (B) 100

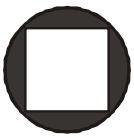
(C) 130 (D) 1000

7. How many different arrangements are there of the letters A, B, C and D ?

(A) 6 (B) 12

(C) 24 (D) 18

8. In the figure below, a square of perimeter 24 is inscribed in a circle. What is the area of shaded region ?



(A) $18\pi - 24$ (B) $18\pi - 36$

(C) $12\pi - 36$ (D) $9\pi - 36$

9. MULTAN : OUOTEN :: PURIFY: _____

(A) RUUIJY (B) OQTVQS

(C) QVSJEZ (D) None of these

10. If word PLAYER is coded as AELPRY, then word MANAGER is coded as :

(A) AEAGMNR (B) AAGEMNR

(C) AAEGMNR (D) AAEGNMR

11. In the sequence below, some letters are missing. From the choices, select the choice that gives the letters that can fill the blanks in the sequence :

a _ b _ _ _ a a _ b c _.

(A) abcabc (B) abccba

(C) abccbc (D) ababcc

12. The entropy of the universe is :

(A) decreasing

(B) increasing

(C) constant

(D) getting halved every year

13. How many 9's are there in the following sequence which are either immediately followed by 9 or immediately preceded by 9 :

793992896793579975

(A) Four (B) Two

(C) Three (D) One

14. What is the next letter in the series ?

B, D, G, K, P, __

(A) S (B) V

(C) W (D) X

15. True value of a quantity can be practically obtained by :

(A) mean of squares of a number of readings taken under no bias conditions such that positive deviations cancel out negative deviations.

(B) mean of a large number of readings taken under no bias conditions such that positive deviations cancel out negative deviations.

(C) whatever is measured by a laboratory or industrial meter.

(D) the actual value obtained after removing parallax error.

16. The sum, s, of probabilities of all outcomes of an event or a statistical experiment is :

(A) zero (B) $0 < s < 1$

(C) $0 \leq s \leq 1$ (D) 1

17. If '+' stands for '–', '–' stands for '×', '×' stands for '÷', and '÷' stands for '+', then evaluate :

$56 \times 7 \div 13 - 11 + 15 - 8 \div 2 - 7$

(A) 30 (B) 45

(C) 60 (D) 90

18. An engineer starts from home and travels 10 m towards West, then turns right and travels 40 m. He then travels 25 m East followed by 50 m towards the South to reach his factory. What is the approximate distance between his home and factory ?

(A) 18 m (B) 125 m

(C) 25 m (D) 105 m

19. A compass was damaged and its needle twisted / turned in such a manner that the pointer which was showing East, now showed North. A man went towards West as per the above mentioned compass. In which direction did he actually go ?

(A) South-West (B) South

(C) North-East (D) North

20. One evening, a person was facing a pole. The shadow of the pole fell to his right. Which direction he was facing ?

(A) East (B) West

(C) North (D) South

21. When a watch shows 3 : 45, the minute hand points towards East. When the watch shows 6 O'clock, in what direction will the hour hand point ?

(A) North (B) South

(C) East (D) West

22. A is the husband of B. E is the daughter of C. A is the father of C. How is B related to E ?

(A) Mother (B) Grandmother

(C) Aunt (D) Cousin

23. If we take the union and intersection respectively of a crisp/classical set with its compliment, what is the resultant in each case ?

(A) 1 and 0 respectively.

(B) 0 and 1 respectively.

(C) Universal set, X, and Null set, ø, respectively.

(D) Null set, ø, and Universal set, X, respectively.

24. If P, Q and R are matrices, and if PQ = PR, then it :

(A) does not imply that Q = R, except if P is non-singular.

(B) always implies that Q = R.

(C) never implies that Q = R.

(D) implies that Q and R are commutative under multiplication.

25. If P and Q are matrices, then :

(A) order of PQ is always the same as that of QP

(B) PQ = QP provided that matrices are conformable for multiplication in both cases

(C) in general, PQ may or may not be equal to QP

(D) both "A" and "B"

26. How many negative integers satisfy $|x+4|+|x-7|<13$?

(A) 2 (B) 3

(C) 4 (D) 5

27. If $x \in R$, the greatest value that $x^4 / (1 + x^8)$ attains is :

(A) 2/5 (B) 1/3

(C) 3/4 (D) 1/2

28. Researcher S's teaching experience (in years) is twice that of researcher M. But 2 years back, S's teaching experience was thrice that of M. How many years S has been teaching ?

(A) 8 years (B) 10 years

(C) 12 years (D) 16 years

29. If you add three quarters of the number of Labs I have, to three quarters of a Lab., you will get the number of Labs I have. How many labs do I have ?

(A) 3 (B) 4

(C) 6 (D) 9

30. A Ph.D. entrance test had 60 questions. A student scores 1 mark for a correct answer, –1/2 for a wrong answer and –1/4 for not attempting a question. A candidate attempted 48 questions and got a net score of 33 marks. How many questions did he attempt wrongly ?

(A) 8 (B) 12

(C) 14 (D) 10

31. Among the visitors to a Lab., the ratio of the number of Professors to B.Tech. students was the same as that of B.Tech. students to Research Scholars. Greater number of visitors were Research Scholars who were attracted by research facilities in the Lab. One day, 7 B.Tech. students visited the said Lab. How many Research Scholars visited the Lab. that day ?

(A) 44 (B) 49

(C) 52 (D) 57

32. A dealer bought an equipment at 30% discount on the list price. He then sold it at a price which is 160% of the list price, thereby making a profit of Rs. 81. What is the list price of the equipment ?

(A) 100 (B) 90

(C) 80 (D) 240

33. A researcher found that for the 1007 pages of his thesis, there were on an average 2 mistakes per page, while in the first 612 pages, there were only 434 mistakes, they seemed to increase for the latter pages. Find the average number of mistakes per page for the remaining pages :

(A) 6 (B) 4

(C) 2 (D) 3

34. After enjoying a feast at my college canteen with 12 friends, I paid Rs. 145 but my each friend paid an equal amount, say X. Later we found that the average sum paid by all of us was Rs. 5 more than what was originally paid by each of my friends. What amount did each friend pay ?

(A) Rs. 120 (B) Rs. 100

(C) Rs. 95 (D) Rs. 80

35. A tank of 60000 litres capacity has three inlet taps P, Q and R which can individually fill the tank in 20, 15 and 12 hours respectively. It has an outlet pipe S which can supply water to 100 houses. If all the pipes are opened simultaneously, how much water enters the tank every hour ?

(A) 8000 litres (B) 9600 litres

(C) 11400 litres (D) 12000 litres

36. In domestic installations, we get phase to ……. voltage which is about …… V while in industrial installations, we usually get phase to …… voltage which is about ……. V:

(A) neutral, 440, phase, 230 (B) neutral, 230, phase, 440

(C) neutral, 230, phase, 400 (D) phase, 230, neutral, 400

37. P, Q, R and S are motor wiremen. Working alone, wireman P can wire 1 motor in 12 hours. Q is 20% faster P. R is 50% faster than P. S is twice as fast as P. In how much time R alone can do wiring of 90 motors ?

(A) 720 hours (B) 600 hours

(C) 320 hours (D) 480 hours

38. P and Q run a closed circuit race. Besides leading just after start, P overtakes Q twice per round. What is P's speed compared to Q's ?

(A) 4 times (B) 3 times

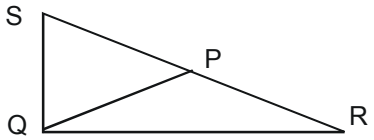
(C) 2 times (D) 5 times

39. An upstream journey of 18 km takes a motor boat 3 hours more than the same distance downstream. If the motor boat speed in still water is twice the speed of the stream, find the speed of the stream :

(A) 7.2 km/hr (B) 6 km/hr

(C) 4.5 km/hr (D) 4 km/hr

40. In the figure below, PQ = PR = PS and angle QRP = 30°. Find angle QSP.



(A) 30° (B) 40°

(C) 45° (D) 60°

41. In the table below, Types of Research are given on left hand side. A few Characteristics are given on the right hand side. Then in the further underneath Table, possible matches are given; select the best choice :

Research Types	**Characteristics**
(a) Fundamental research	(i) Finding out the extent of perceived impact of an intervention.
(b) Applied research	(ii) Developing an effective foundation through theory building.
(c) Action research	(iii) Improving an existing situation through the use of apt interventions.
(d) Evaluative research	(iv) Exploring the possibility of a theory for use in various situations.

	(a)	(b)	(c)	(d)
(A)	(i)	(ii)	(iii)	(iv)
(B)	(ii)	(iii)	(iv)	(i)
(C)	(iii)	(iv)	(i)	(ii)
(D)	(ii)	(iv)	(iii)	(i)

42. A researcher is asked, "What is the probability of finding an apple in the refrigerator ?" The researcher had no idea, neither knowledge nor prior information about an apple having been kept in the refrigerator. Yet he answers, without bias or inclination, as follows; what is his best answer ?

(A) 1.0 (B) 0.75

(C) 0.5 (D) 0

43. While writing a research paper, which one of the following statements is most *true* ?

(A) The 'Abstract' contains a gist of the entire paper but has no citation of references.

(B) The 'Abstract' contains a gist of the entire paper and has citation of references cited in the 'Abstract' part alone.

(C) The 'Future Directions' section must cite the possible offshoots which the authors perceive themselves as well as those perceived by previous researchers.

(D) The 'Materials and Methods' section, if detailed in the paper, must carry out a comprehensive analysis of results.

44. A chain has five links in it, each of which can individually carry a maximum weight of 2.3 Kg, 1.7 Kg, 5.3 Kg, 2.7 Kg and 0.7 Kg. Then which statement is most apt for this chain ?

(A) The strength of this chain is that of the strongest link in it

(B) The strength of this chain is that of the weakest link in it

(C) The strength of this chain is 12.7 Kg

(D) The strength of this chain is the average of the individual link strengths

45. What type of reasoning is used in the following statement ?

"Superiority of intellect depends on its power of concentration on one theme in the same way as a convex lens collects all the rays that strike upon it, into one point" :

(A) Psychological (B) Mathematical

(C) Deductive (D) Analogical

46. In the context of publications, which statement is *true* for SCI ?

(A) Scientific Citation Index is a citation index originally produced by the Institute for Scientific Information and created by Eugene Garfield.

(B) Super Citation Index is a citation index originally produced by the Institute for Scientist's Information and created by Bill Gates.

(C) Science Citation Index is a citation index originally produced by the Institute for Scientific Information and created by Eugene Garfield.

(D) Science Common Index is a citation index originally produced by the Institute for Scientific Information and created by Clarivate Analytics.

47. The term ICT usually refers to :

(A) An acronym that stands for Indian Classical Technologies

(B) Convergence of audio-visual and telephone networks with computer networks through a single cabling or link system

(C) Unified communications and integration of telecommunications, computers, enterprise software, middleware, audio-visual systems and storage

(D) Both "B" and "C"

48. With reference to a fixed frame of reference, your competitor moves forward with a velocity of 9.8 m/second while you too move forward a velocity of 5.2 m/sec with reference to the same frame. What is your velocity vis-à-vis that of your competitor ?

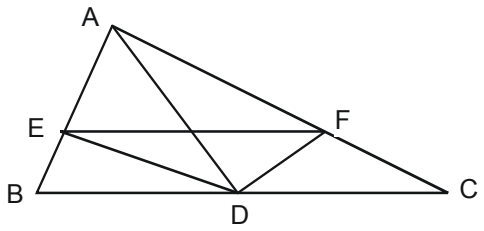
(A) 15 m/sec in forward direction

(B) 4.6 m/sec in forward direction

(C) 7.5 m/sec in forward direction

(D) 4.6 m/sec in backward direction

49. In the following figure (not drawn to scale), angle DEF = 35°. Find the other two angles of triangle DEF if DE and DF are the angle bisectors of angles ADB and ADC respectively :



(A) 30° and 120°

(B) 65° and 80°

(C) 55° and 90°

(D) 70° and 75°

50. A publisher publishes journals in two modes – Subscription mode, and Open access mode. Which choice is most correct in the context of an open access journal :

(A) It is a journal of which the subscription cost is borne by the subscriber.

(B) It is a journal of which the contents are freely accessible by anybody in the world.

(C) It is a journal of which the subscription cost per paper is borne by the respective author.

(D) "B" and "C"

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51. If A, B, C are mutually exclusive events associated with a random experiment and P(B) = 0.6P(A) and P(C) = 0.2P(A), then find P(A) :

(A) 5/9 (B) 9/5

(C) 1 (D) 5/4

52. The Fourier series of $f(x)=\begin{cases}-x+1, & -\pi \le x < 0 \\ x+1, & 0 \le x \le \pi\end{cases}$ has the following terms in its expansion :

(A) Cosine terms only

(B) Sine terms only

(C) Both (A) and (B)

(D) Tan term

53. The solutions of $\frac{d^2y}{dx^2}+a\frac{dy}{dx}+by=0$ is given as $y=c_1e^{-x}+c_2e^{-3x}$ then (a, b) is :

(A) (–4, 3) (B) (4, –3)

(C) (–4, –3) (D) (4, 3)

54. Given an orthogonal matrix $A=\begin{bmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & -1\\ 1 & -1 & 0 & 0\\ 0 & 0 & 1 & -1\end{bmatrix}$, then the $(A\times A^T)^{-1}$ is equal to :

(A) 0 (B) 1

(C) I (D) –1

55. If $x = r\cos\theta, y = r\sin\theta$, then the value of $\frac{\partial^2\theta}{\partial x^2} + \frac{\partial^2\theta}{\partial y^2}$ is :

(A) 0 (B) 1

(C) $\frac{\partial r}{\partial x}$ (D) $\frac{\partial r}{\partial y}$

56. The order and degree of differential equation $\frac{\{1+(\frac{dy}{dx})^2\}^{\frac{3}{2}}}{\frac{d^2y}{dx^2}} = \gamma$ are respectively :

(A) 2, 2 (B) 2, 6

(C) 2, 3 (D) 1, 6

57. Voltage transfer function of a sample RC Integrator has :

(A) A finite zero and a pole at infinity

(B) A finite zero and a pole at origin

(C) A zero at the origin and a finite pole

(D) A zero at infinity and a finite pole

58. For a network of 11 branches and 6 nodes, what is the number of independent loops ?

(A) 4 (B) 5

(C) 6 (D) 11

59. If a two-port network is reciprocal as well as symmetrical, which one of the following relationship is correct ?

(A) $Z_{12} = Z_{21}$ and $Z_{11} = Z_{22}$ (B) $Y_{12} = Y_{21}$ and $Y_{11} = Y_{22}$

(C) AD-BC = 1 and A = D (D) All of these

60. What is the characteristic impedance Z_0 of a line having resistance R, inductance L, capacitance C and conductance G :

(A) $\sqrt{\frac{R + jwl}{G + jwc}}$ (B) $\sqrt{\frac{G + jwc}{R + jwl}}$

(C) $R + jwl - \frac{G}{wc}$ (D) $\sqrt{R^2 + \left(wl - \frac{1}{wc}\right)^2}$

61. Two coils have self-inductance of 0.09H and 0.01H and a mutual inductance of 0.015H. The coefficient of coupling between the coils is :

(A) 0.06 (B) 0.5

(C) 1.0 (D) 0.05

62. Which of the following systems is Causal ?

(A) $y(t) = x(2 - t) + x(t - 4)$ (B) $y(t) = x^2(t) + x(t - 4)$

(C) $y(t) = \int_{-\infty}^{3t} x(T)\, dT$ (D) $y(t) = \int_{-\infty}^{3t} x(T + 2)\, dT$

63. What is the Fourier transform of $\frac{d^n f(t)}{dt^n}$:

(A) $(-j\omega)^n F(\omega)$ (B) $(j\omega)^n F(\omega)$

(C) $(\omega)^n F(\omega)$ (D) $j\omega F(\omega)$

64. Frequency domain of a periodic triangular function is a :

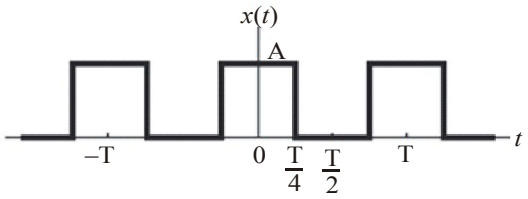
(A) Discrete sampling function

(B) Discrete sync function

(C) Continuous sampling square function

(D) Continuous sampling function

65. Find the $x(t)$ for the waveform :



(A) $\frac{A}{j\pi k}\sin\left(\frac{\pi}{2}k\right)$ (B) $\frac{A}{j\pi k}\cos\left(\frac{\pi}{2}k\right)$

(C) $\frac{A}{\pi k}\sin\left(\frac{\pi}{2}k\right)$ (D) $\frac{A}{\pi k}\cos\left(\frac{\pi}{2}k\right)$

66. In a linear circuit, the superposition principle can be applied to calculate the :

(A) Voltage and Power (B) Voltage and Current

(C) Current and Power (D) Voltage, Current and Power

67. A Hall effect transducer can be used to measure :

(A) Displacement, temperature and magnetic flux

(B) Displacement, position and velocity

(C) Position, magnetic flux and pressure

(D) Displacement, position and magnetic flux

68. The depletion layer across a P^+-n junction lies :

(A) Mostly in the P^+-region

(B) Mostly in the *n*-region

(C) Equally in both the P^+- and n-regions

(D) Entirely in the P^+-region

69. Which one of the following is the correct relationship between the band gap of a material used in a photo detector and the energy of the incident photon :

(A) $E_g \geq hc/\lambda$ (B) $hv^2/\lambda \geq E_g$

(C) $hv \geq E_g$ (D) $1/2hv \geq E_g$

70. Consider the following statements :

FET when compared to BJTs have

1. High input impedance
2. Current flow due to majority carriers
3. Low input impedance
4. Current flow due to minority carriers

Which of the statements given above are *correct* ?

(A) 1 and 4 (B) 2 and 3

(C) 3 and 4 (D) 1 and 2

71. An I.C operational amplifier has a typical open loop gain of 1200 and the common mode rejection of 55dB. What is the common mode rejection ratio ?

(A) 550 (B) 560

(C) 570 (D) 580

72. Which one of the following devices can be turned 'ON' and 'OFF' by applying gate signal ?

(A) SCR (B) SCS

(C) TRIAC (D) UJT

73. A 1ms pulse can be stretched to 1s pulse by using :

(A) An astable multi-vibrator

(B) A monostable multi-vibrator

(C) A bistable multi-vibrator

(D) A Schmitt trigger circuit

74. A half-wave rectifier having a resistance load of 1 kΩ rectifies an a.c voltage of 325 V peak value and the diode has a forward resistance of 100 Ω. What is the RMS ?

(A) 294.4 mA (B) 94.0 mA

(C) 147.7 mA (D) 208.0 mA

75. What is the main advantage of a JFET-cascade amplifier ?

(A) High voltage gain

(B) Low output impedance

(C) Very low input capacitance

(D) High input impedance

76. Consider a 565 PLL with R_T=10kΩ and C_T = 0.01μF. What is the output frequency of the V_{CO} is :

(A) 10 kHz (B) 5 kHz

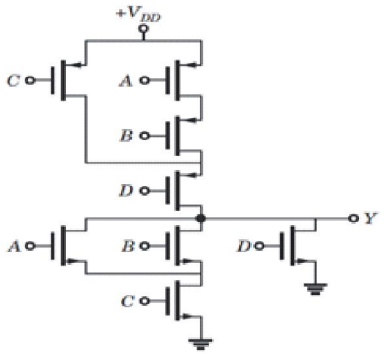
(C) 2.5 kHz (D) 1.25 kHz

77. A common emitter transistor amplifier has a collector load of 10 kΩ. If its h_{fe} = 2kΩ (h_{re} and h_{oe} equal to zero), the voltage amplification of the amplifier is nearly equal to :

(A) 500 (B) 200

(C) 100 (D) 50

78. The output function Y of a given circuit is :



(A) $\overline{(AB+C)D}$ (B) (A + B)C + D

(C) (AB + C)D (D) $\overline{(A+B)C+D}$

79. An 8-bit successive approximation ADC has full scale reading of 2.55V and its conversion time for an analog input of 1 V is 20 micro second. The conversion time for a 2V input will be :

(A) 10 μs (B) 20 μs

(C) 40 μs (D) 50 μs

80. How many address inputs, data outputs are required for a 16k × 12 memory ?

(A) 12, 12 (B) 16, 12

(C) 8, 8 (D) 16, 16

81. Race around condition occurs in :

(A) JK Flip-Flop

(B) SR Flip-Flop

(C) Master and Slave JK Flip-Flop

(D) T- Flip-Flop

82. Excitation Table is :

(A) Outputs are known after inputs

(B) Outputs are known before inputs

(C) Outputs and inputs are specified simultaneously

(D) Only inputs are specified

83. The instruction set of a microprocessor :

(A) is stored inside the microprocessor

(B) is specified by the User

(C) can be changed by the user

(D) is specified by the Manufacturer

84. In 8085 Microprocessor system, in response to RST 7.5 interrupt the execution is transferred to memory location :

(A) 0000H (B) 003CH

(C) 002CH (D) 0034H

85. In Microprocessor based systems DMA facility is required to :

(A) Increase the speed of data transfer between the microprocessor and I/O devices

(B) Increase the speed of data transfer between the microprocessor and Memory

(C) Improve the reliability of the system

(D) Increase the speed of data transfer between the memory and I/O devices

86. Determine the initial value of the current $I(s) = \frac{0.42}{s\left(s^2 + 0.35s + 0.816\right)}$:

(A) 1 (B) ∞

(C) 0 (D) 0.5

87. If the Laplace transform of a signal $y(t)$ is $Y(s) = \frac{1}{s(s-1)}$, then its final value is :

(A) –1 (B) 0

(C) 1 (D) Unbounded

88. The number of roots of the equation $s^3 + 5s^2 + 7s + 3 = 0$ in the left half of the s-plane :

(A) Zero (B) One

(C) Two (D) Three

89. The Transfer Function $Y(s)/U(s)$ of a system described by the state equations $\dot{x}(t) = -2x(t) + 2u(t)$, $y(t) = 0.5x(t)$ is :

(A) $\frac{0.5}{(s-2)}$ (B) $\frac{0.1}{(s-2)}$

(C) $\frac{0.5}{(s+2)}$ (D) $\frac{1}{(s+2)}$

90. A good control system has all the following features *except* :

(A) Good stability

(B) Slow response

(C) Good accuracy

(D) Sufficient power handling capacity

91. The step response of a particular control system is given by $c(t)=1-10e^{-t}$. Then its transfer function is :

(A) $\frac{1-9s}{s(s+1)}$ (B) $\frac{s-9}{s+1}$

(C) $\frac{1-9s}{s+1}$ (D) $\frac{10}{s+1}$

92. Signal $x(t)=3\sin 2\pi 10^3 t+2\sin 2\pi 660t$, at what sampling frequency should this signal be samples to avoid aliasing ?

(A) 1320 Hz (B) 2000 Hz

(C) 2[1000 + 660] Hz (D) 2[1000 – 660] Hz

93. The white noise has a constant power spectral density and its autocorrelation function is :

(A) Constant

(B) Dirac-delta function

(C) Sinusoidal function

(D) Triangular function

94. A source generates four messages with probability 1/8, 1/8, 1/4 and 1/2, what is the entropy of the source (bits/messages) ?

(A) 1 (B) 1.75

(C) 2 (D) 4

95. If the radiated power of AM transmitter is 10 kW, the power in the carrier for the modulation index of 0.6 :

(A) 8.24 kW (B) 8.47 kW

(C) 9.26 kW (D) 9.6 kW

96. An angle modulated signal is given by $f(t) = \cos\left(2\times10^8\,\pi t + 75\sin 2\times10^3\,\pi t\right)$ the peak frequency deviation of carrier will be :

(A) 1 kHz (B) 7.5 kHz

(C) 75 kHz (D) 100 kHz

97. Multiple member of antennas are arranged in arrays in order to enhance what property :

(A) Both diversity and bandwidth

(B) Only directivity

(C) Only bandwidth

(D) Neither directivity nor bandwidth

98. In a uniform plane wave, the value of $|E|/|H|$:

(A) $\sqrt{\frac{\mu}{\varepsilon}}$ (B) $\sqrt{\frac{\varepsilon}{\mu}}$

(C) 1 (D) $\sqrt{\mu\varepsilon}$

99. A quarter wave transformer matching a 75Ω source with a 300Ω load should have a characteristic impedance of :

(A) 50 Ω (B) 100 Ω

(C) 150 Ω (D) 200 Ω

100. $E_x = \cos(\omega t + \beta z)$ represents a wave travelling in the :

(A) Negative *x*-direction

(B) Positive *x*-direction

(C) Positive *z*-direction

(D) Negative *z*-direction