

1. Of the following quantities, which one has dimensions different from the remaining three?
 - a. energy per unit volume
 - b. force per unit area
 - c. product of voltage and charge per unit volume
 - d. angular momentum per unit mass

2. A moving body is covering distances in proportions to the square of time. The acceleration of the body is
 - a. increasing
 - b. decreasing
 - c. zero
 - d. constant

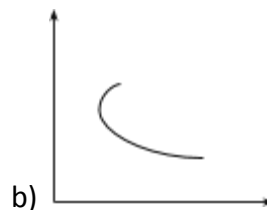
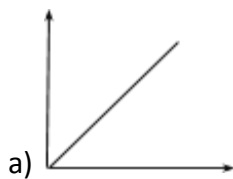
3. In the gas equation $PV=RT$, V stands for volume of
 - a. any amount of gas
 - b. 1 mole of gas
 - c. 1 gram of gas
 - d. 1 liter of gas

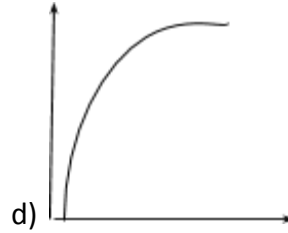
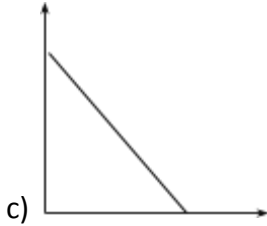
4. A boy suddenly comes and sits on a circular rotating table. What will remain conserved?
 - a. linear momentum
 - b. kinetic energy
 - c. angular momentum
 - d. potential energy

5. How many electrons are contained in ${}_{92}\text{U}^{238}$ nucleus?
 - a. 92
 - b. 146
 - c. 238
 - d. Zero

6. Main function of a transistor is to
 - a. Rectify
 - b. Simplify
 - c. Amplify
 - d. All of the above

7. A graph is plotted between the angle of incident (i) and angle of reflection(r). The correct variation is shown by





8. The current through a conductor is doubled, the rate of rise of temperature in the conductor will be
- a. Halved b. Doubled c. Four times d. Unchanged
9. When two bodies stick together after collision, the collision is said to be
- a. Partially elastic b. Elastic c. Inelastic d. Plastic
10. The following question consists of two statements; one labeled as STATEMENT 1 and other labeled as STATEMENT 2. Examine the statements carefully and select the answer using the codes given below.
- a. Both **statement 1** and **statement 2** are **true** and **statement 2** is the **correct** explanation of **statement 1**.
- b. Both **statement 1** and **statement 2** are **true** and **statement 2** is not the **correct** explanation of **statement 1**.
- c. **Statement 1** is true but **statement 2** is false.
- d. **Statement 1** is false but **statement 2** is true.

STATEMENT 1: Work done by or against the force of friction in moving a body through any round trip is zero. **Because STATEMENT 2:** Friction is a non-conservative force.

11. According to Hooke's "within elastic limit stress is proportional to strain". We can write this as

- a. Stress x Strain = λ
- b. (λ x Strain)/Stress = 0
- c. Stress/ Strain = λ
- d. Strain = λ x Stress

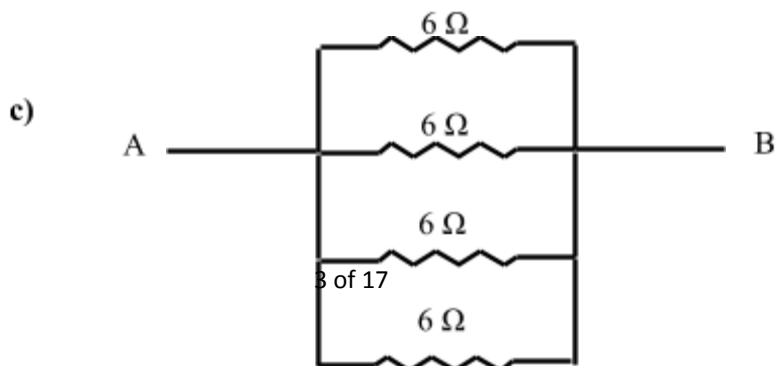
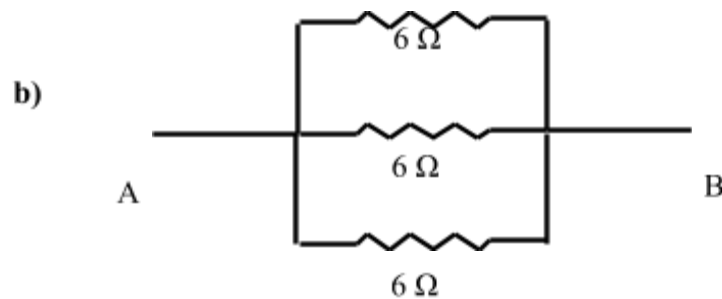
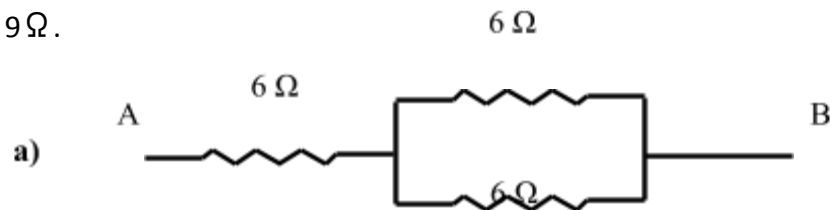
12. An electric bulb is rated 220V and 100 W. When it is operated on 110V, the power consumed will be

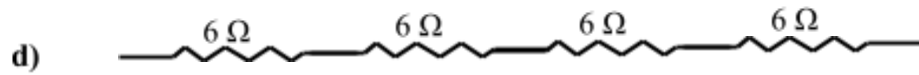
- a. 100 W
- b. 75 W
- c. 25 W
- d. 25 W

13. At the time of short circuit, the current in the circuit

- a. Reduces substantially
- b. Does not change
- c. Increases heavily
- d. Vary continuously

14. Show how you would connect three resistors, each of resistance $6\ \Omega$, So that the combination has a resistance of $9\ \Omega$.

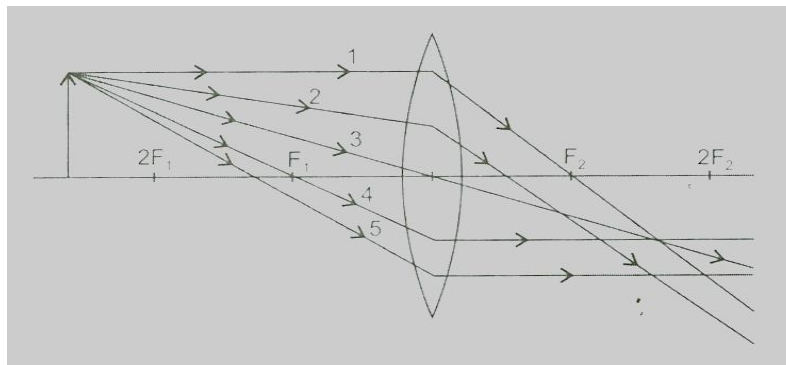




15. The device for producing electric current is called a

- a. Generator b. Galvanometer c. Ammeter d. Motor

16. Out of the five incident rays shown in the figure, find the two rays that are not obeying the laws of refraction and as such cannot be used for locating the position of image formed by a convex lens.



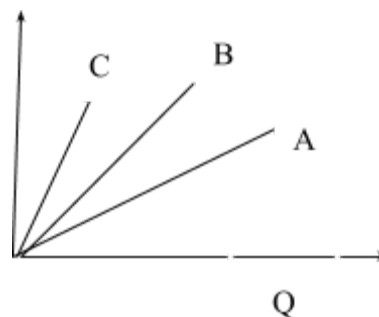
- a. 2 & 3 b. 3 & 4 c. 4 & 5 d. 2 & 5

a. 2

17. A substance has a critical angle of 45° for yellow light. Its refractive index is

- a. $\sqrt{2}$ b. $\sqrt{4}$ c. 2 d. 4

18. The figure shows the variation of Voltage V across the plates of two capacitors A and B versus increase of charge Q stored on them. Which of the capacitors has higher capacitance?



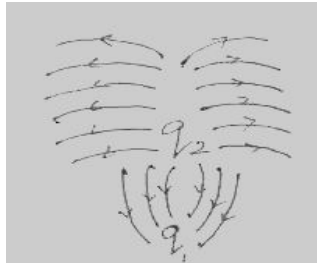
- a. C
b. A

- c. B
- d. Both C and A

19. How much is the electric potential of a charge at infinity?

- a. Maximum
- b. Minimum
- c. Zero
- d. Depend on the angle

20. Consider the situation shown in the following figure. What are the signs of q_1 and q_2 ?



- a. q_1 is +ve, q_2 is -ve
- b. q_1 is -ve, q_2 is +ve
- c. q_1 and q_2 both are +ve
- d. q_1 and q_2 both are -ve

21. Calculate the number of molecules in 16g of Sulphur.

- a. $1 \times 6.023 \times 10^{23}$
- b. $0.5 \times 6.023 \times 10^{23}$
- c. $1.6 \times 6.023 \times 10^{23}$
- d. none of the above

22. The amount of iron(III) oxide produced by the complete oxidation of 222g of Iron is

- a. 2 moles
- b. 0.5 moles
- c. 4 moles
- d. 1 mole

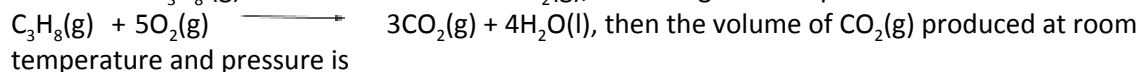
23. Evaporation of water is an
- an exothermic process
 - an endothermic process
 - an exothermic process at 100°C
 - an endothermic process above 100°C
24. A gas absorbs 10J of heat and is simultaneously compressed by a constant external pressure of 0.5atm from 4L to 2L in volume. What is the change in the internal energy (in J) of the gas?
- 101 J
 - 111 J
 - 2 J
 - none of the above
25. A given mass of oxygen gas occupies 20L at 25°C . Its volume at 50°C with pressure remaining constant will be
- 20 L
 - 23.4 L
 - 21.6 L
 - 22.7 L
26. Which of the following compounds of nitrogen is basic
- NH_3
 - NHCl_3
 - NO
 - NO_2
27. At room temperature H_2S is gas and H_2O is a liquid due to
- Presence of intra molecular hydrogen bonding in water
 - Presence of intermolecular hydrogen bonding in water
 - Sulphur is a solid
 - oxygen is a gas
28. What is the oxidation state of Cr in $\text{K}_2\text{Cr}_2\text{O}_7$?
- 6
 - 3
 - 4
 - 7
29. Which of the following has the smallest radius?
- Li^+
 - Na^+
 - Be^{2+}
 - Mg^{2+}

30. Write the coefficients x,y,p and q in the following equation



- a. 3,7,4,9 b. 2,7,4,6 c. 2,6,4,6 d. none of these

31. If 1.5 mol of $\text{C}_3\text{H}_8(\text{g})$ are burnt in 4.5 mol of $\text{O}_2(\text{g})$, according to the equation



- a. 180 L b. 0.9 L c. 72.0 L d. 64.8 L

32. Which of the following is a strong electrolyte?

- a. KCl b. NH_4Cl c. CH_3COOH d. HCOOH

33. For the reaction $\text{H}_2(\text{g}) + \text{I}_2(\text{s}) \longrightarrow 2\text{HI}(\text{g})$, the partial pressure of $\text{H}_2(\text{g})$ and $\text{HI}(\text{g})$ are 4.0 and 1.0 atm respectively. K_p for the reaction is

- a. 20 atm b. 400 atm c. 25 atm d. 12.5 atm

34. The states of hybridization of Phosphorus and Oxygen in H_3PO_4 are

- a. sp^3 & sp^3d^2 b. sp^3d^2 & sp^3 c. sp^3 & sp^2 d. sp^3d^3 & sp

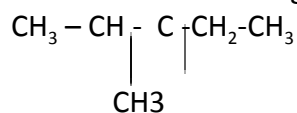
35. Which one of the following has minimum boiling point?

- a. n-butane b. 1-butyne c. 2-butyne d. isobutene

36. Nylon treads are made of

- a. polyvinyl polymer
b. polyester polymer
c. polyamide polymer
d. polyethylene polymer

37. Name the following compound



- a. 2-methyl 3-pentanone
b. 4-methyl-3-pentanone
c. 2,2 dimethyl-3-butanone
d. 3-methyl-4-pentanone

38. A compound "A" on reaction with HCN followed by hydrolysis gives lactic acid. The compound "A" is
- a. Ethanol b. Propanol c. Ethanal d. Propanone
39. Among the following acids, which has the lowest pH value
- a. HCOOH b. CH₃COOH c. (CH₃)₂CHCOOH d. CH₃CH₂COOH
40. Which type of isomerism is shown by 2,3 dichlorobutane?
- a. Structural b. Geometric c. Optical d. Functional
41. If A and B are two sets such that $n(A) = 37$, $n(B) = 26$ and $n(A \cup B) = 51$, find $n(A \cap B)$
- a. 13 b. 12 c. 11 d. none of these
42. Find the range of the following relation $R = \{(-1, 1), (1, 1), (2, 4), (-2, 4), (3, 9)\}$
- a. {2,4,9} b. {-1,1,2} c. {1,4,9} d. {3,4,-1}
43. Find the distance between the points: A (a+b, a-b) and B(a-b, a+b)
- a) $\sqrt{2}$ units b) $2\sqrt{2}$ units c) $2\sqrt{2}b$ units d) None of these
44. What is the inclination of a line whose slope is positive?
- a. Acute angle b. Obtuse angle c. Right angle d. Reflex angle
45. Find the value of $\sqrt[4]{256^{\frac{3}{4}}}$
- a) $2^{\frac{3}{4}}$ b) $4^{\frac{3}{4}}$ c) 4 d) 1
46. The value of $\frac{36^{\frac{1}{2}} \times \sqrt{81}}{\sqrt{225}}$
- a. 9/5 b. 2/5 c. 9/15 d. 18/5
47. Solve for x and y : $3x - 5y = -1$
 $x - y = -1$
- a. x=3, y=1 b. x=-2, y=-1 c. x=0, y=0 d. None of these

48. 5 pencils and 7 pens together cost Rs 50, whereas 7 pencils and 5 pens together cost Rs 46. Find the cost of one pencil and one pen. Rs. stands for Indian Rupees.

- a. Pencil: Rs 3, Pen : Rs 5
- b. Pencil: Rs 5, Pen : Rs 3
- c. Pencil: Rs 6, Pen : Rs 4
- d. Pencil: Rs 5, Pen : Rs 2

49. The arithmetic mean (average) of 1,2,3,.....n

- a) $\frac{n+1}{2}$ b) $\frac{n-1}{2}$ c) $\frac{n}{2}$ d) $\frac{n}{2} + 1$

50. The median of first 10 prime numbers is

- a. 11 b. 12 c. 13 d. 14

51. A child has a block in the shape of a cube with one letter written on each face as shown below. The cube is thrown once. What is the probability of getting letter 'A'?

A	B	C	D	E	A
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- a. $\frac{2}{3}$ b. $\frac{1}{3}$ c. $\frac{4}{3}$ d. $\frac{1}{6}$

52. Two dice are thrown simultaneously, what is the probability of getting 'a double of even numbers'?

- a. $\frac{2}{36}$ b. $\frac{1}{36}$ c. $\frac{3}{36}$ d. None of these

53. In a $\triangle KMN$, PQ is parallel to MN. If $\frac{KP}{PM} = \frac{4}{13}$, KN = 20.4 cm. Find KQ

- a. 4cm b. 4.8 cm c. 5 cm d. 4.6 cm

54. All circles are _____

- a. Congruent b. Similar c. Neither similar nor congruent d. 3-D shapes

55. A tangent to a circle intersects it in _____ point (s).

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

56. Find the value of θ (angle) for $2\cos \theta = 1$

- a. 45° b. 30° c. 60° d. 0°

57. A tower is $100\sqrt{3}$ metres high. Find the angle of elevation if it's top from a point 100 meters away from its foot.

- a) $\theta = 30^\circ$ b) $\theta = 60^\circ$ c) $\theta = 45^\circ$ d) $\theta = 90^\circ$

58. Find the one zero of the polynomial $p(x) = x^4 + x^3 - 34x^2 - 4x + 120$ from the given options

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

59. Find the remainder when $x+1$ is divided by $x^2 + 5x + 6$

- a. 0 b. 3 c. 2 d. 5

60. What is the coefficient of x^4 in the expansion of $(3x+2y)^4$

- a. 80 b. 81 c. 90 d. 9

61. If $7x + 5 = 8x - 10$, what is the value of x ?

- a. 15 b. 15 c. 10 d. 20

62. The sum of 23 terms of the AP 5,9,13,17,,,,,,,,,,,, is

- a. 1120 b. 1121 c. 1127 d. 54

63. What is the value of $\begin{bmatrix} 1 & 0 & 0 & -2 & 1 & 0 & 1 & -2 & 1 \end{bmatrix} \times \begin{bmatrix} 1 & 1 & 0 \end{bmatrix}$

- a) $\begin{bmatrix} 1 & -1 & -1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 2 & 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 & -1 & 1 \end{bmatrix}$

64. If $\sin \theta = \frac{3}{5}$, find the value of $\cot \theta$

- a. $\frac{3}{4}$ b. $\frac{4}{3}$ c. $-\frac{4}{5}$ d. $\frac{5}{4}$

65. Find the derivative of x^9

- a. $8x^7$ b. $9x^7$ c. $9x^8$ d. $9x^6$

66. What is the derivative (differentiation) of $x^{\frac{-3}{2}}$

a) $x^{\frac{-5}{2}}$ b) $x^{\frac{-6}{2}}$ c) $\frac{-3}{2}x^{\frac{-5}{2}}$ d) $\frac{-3}{2}x^{\frac{-4}{3}}$

67. Add the two vectors: $a = 2i + 3j + 4k$, $b = 6i - 4j + 3k$. the result is

- a. $8i + 2j + 7k$ b. $8i - j + 7k$ c. $4i + j - 6k$ d. None of these

68. If the vector $a = 2i + 3j - k$, find $|a|$

a) $\sqrt{13}$ b) $\sqrt{15}$ c) $\sqrt{14}$ d) $\sqrt{6}$

69. The cost of 6 pens is Rs 90. What would be the cost of 10 such pens? Rs. is Indian Rupees.

- a. Rs 160 b. Rs 100 c. Rs 150 d. Rs 120

70. The ages of two persons are in the ratio 5: 7, Eighteen years ago their ages were in the ratio 8 : 13. Find the present age.

- a. 50 and 70 b. 50 and 60 c. 40 and 60 d. None of these.

READING COMPREHENSION

Read the following passage carefully and answer the questions that follow.

Computers are capable of doing extremely complicated work in all branches of learning. They can solve the most complex mathematical problem or put a thousand unrelated data in order. These machines can be put to varied uses. For instance, they can provide information on the best way to prevent traffic accidents. They work accurately and at high speed. They save research workers' years of hard work. This whole process, by which machines can be used to work for us, has been called 'automation'. In future, automation may be enable human beings to enjoy more leisure than they do today. The coming of automation is bound to have important social consequences.

Some years ago, an expert on automation, Sir Leon Bagrit, pointed out that it was a mistake to believe that these machines could think. There is no possibility that human beings will be controlled by machines. Though computers are capable of learning from their mistakes and improving on their performances, they need detailed instructions from human beings to be able to operate. They can never live independent lives or 'rule the world' by taking decisions of their own.

Sir Leon said that, in future, computers would be developed which would be small enough to be carried in one's pocket. Ordinary people would then be able to use them to obtain valuable information. Computers could be plugged into a wireless network and can be used like radios. Car drivers can be given an alternative route when there is a traffic jam. It will also be possible

to make tiny translating machines. This will enable people who do not share a common language to talk to each other without any difficulty or to read foreign publications.

On the basis of your reading of the passage, answer the following questions 71 to 75 by choosing the best of the given choices.

71. State the two main capabilities of computers.
- a. varied uses, provide information
 - b. complicated work in all branches, put data in order
 - c. work at high speed, prevent traffic accidents
 - d. automation, save hard work

72. What is automation?

- a. the thinking machine
- b. machines capable of learning by their mistakes
- c. machines that can improve on their performances
- d. the process by which machines can be used to work for us

73. Can computers rule the world?

- a. yes, because they can do more complicated work than human beings
- b. yes, because they are much more versatile than human beings
- c. no, because they cannot function without electricity
- d. no, because they cannot think independently

74. The importance of computers....

- a. will rise in the coming years
- b. will decline as new machines will be invented
- c. is impossible to assess
- d. is overrated as the human mind is far superior

75. 'Tiny' in paragraph 3 means...

- a. Small
- b. Cheap
- c. Visible
- d. Huge

76. Choose the appropriate relative pronoun for the blank in the given below sentence. **"It is exactly this pouch _____ I lost last week".**

- a. Who
- b. That
- c. When
- d. Which

77. Identify the correct superlative sentence.

- a. New York is one of the big city in the world.
- b. New York is one of the big cities in the world.
- c. New York is one of the biggest cities in the world.
- d. New York is one of the bigger city in the world.

78. Which one of the following is a passive sentence?

- a. Mr. John likes swimming.
- b. The snake was caught by the forest officials.
- c. A dog had chased me.
- d. The team A will definitely win the match on Friday.

Fill in the blanks by choosing the correct preposition.

Take proper care _____ your hands, especially the nails. They should be kept dirt-free and trimmed regularly. Hair should be washed regularly _____ appear neat and tidy.

79. The first blank should be filled by the preposition

- a. by
- b. to
- c. in
- d. of

80. The second blank should be filled by the preposition

- a. to
- b. by
- c. from
- d. in

81. Now it is autumn. The leaves in the trees are turning _____. (Choose the most appropriate answer that applies).

- a. Brown
- b. Green
- c. Small
- d. Big

82. Thiri Khit spoke with such _____ that even her 3-year old understood what she wanted him to do. (Choose the most appropriate choice that applies).

- a. Clarity
- b. Clear
- c. Clearness
- d. Clearly

83. An _____ was appointed to settle the dispute between the villagers and the visitors. (Choose the most appropriate choice that applies).

- a. Arbiter
- b. Advocate
- c. Judge
- d. Administrator

84. Jenny was a good debater. Her arguments were so _____ that even her opponents would agree with her

- a. Cogent
- b. Coherent
- c. Cohesive
- d. Eloquent

85. David had such a _____ attitude that he treated everyone around him like a bunch of kids.

- a. Patronizing
- b. Haughty
- c. Dictatorial
- d. Disdainful

86. It is _____ to try to explain the difference between right and wrong to your pet dog.
- a. Futile b. Cryptic c. Complex d. Obscure
87. Older kingdoms did not become constitutional republics overnight. On the contrary, the change was _____.
- a. Gradual b. Sufficient c. Unpopular d. Unexpected
88. The onset of the earthquake was gradual, the tremors occurring _____ at first, then with greater frequency.
- a. Sporadically b. Chronically c. Intensely d. Continuously
89. I dream of a good luxurious life. I want to join the IT industry as a software developer since these jobs are _____.
- a. Lucrative b. Challenging c. Easy d. Exciting
90. Many viruses and worms infect an Internet browser by exploiting one or more _____ in the browser.
- a. Vulnerabilities b. Securities c. Strengths d. Functionalities
91. _____ Sheila. I am an expert on Internet security, and I can help you're your corporate solutions safe.
- a. I am b. Myself c. Me d. I was
92. In the last few years, computer manufacturers have focused on improving storage through semiconductor and optical _____.
- a. Memories b. Memory c. Capabilities d. Memoires
93. We could spare ourselves a lot of agony if we learnt to live _____ our means.
- a. Within b. Inside c. Without d. With
94. Tom, Dick and Harry came to bid me goodbye. I told them to take care of _____.
- a. Themselves b. Himself c. Them 4. Theirs

95. (Choose the most appropriate word that would replace the word underlined in the sentence, without altering its original meaning).

After a thorough inspection of the computer and the software, the most malicious virus was extricated.

- a. Removed b. Located c. Scrutinized d. Vaunted

96. (Choose the most appropriate word that would replace the word underlined in the sentence, without altering its original meaning).

He ate a prodigious amount of homemade bread.

- a. Huge b. Slight c. Tiny d. Moderate

97. (Choose the most appropriate word that would replace the word underlined in the sentence, without altering its original meaning).

The project plan was in disarray since there were a number of problems that the team was unable to surmount.

- a. Overcome b. Decline c. Understand d. Denude

98. (Choose the most appropriate word that would replace the word underlined in the sentence, without altering its original meaning).

In our company, Mary was unequivocally one of the best programmers and problem solvers.

- a. Definitely b. Arguably c. Ingeniously d. Unwittingly

99.

(Choose the most appropriate word that would replace the word underlined in the sentence, without altering its original meaning).

When the CEO presented the bad results of the company, the Board posed several unsettling questions to him.

- a. Troubling b. Refreshing c. Thrilling d. Frightening

100. In writing an email communication to your professor, which of the following salutations is most appropriate?

- a. Dear Sir b. Hello Sir c. Hi Sir d. Howdy Sir