**B.TECH**

**(LET - FINAL)**

**Direction** (Question No. 1 and 2): Pick out the correct form of reported speech for the following.

1. Pick out the correct form of reported speech for the following.

The leader said to his followers: “I belong to the past. I am history.”

|  |  |
| --- | --- |
| (A) | The leader cried to his followers that he belong to the past and he was history. |
| (B) | The leader suggested to his followers that he belonged to the past and he was history. |
| (C) | The leader told his followers that he belonged to the past and he was history. |
| (D) | The leader lamented that he belonged to the past and he was history. |

2. Pick out the correct form of reported speech for the following.

The Professor said to his student: “You were right.”

|  |  |
| --- | --- |
| (A) | The Professor said to his student that he was right. |
| (B) | The Professor told his student that he was right. |
| (C) | The Professor declared that his student was right. |
| (D) | The Professor told his student that he had been right. |

**Direction** (Question No. 3 to 5):

3. Fill in the blanks with the correct answer selected from the choice given below.

Why ………. I herespan?

|  |  |
| --- | --- |
| (A) | may |
| (B) | shall |
| (C) | am |
| (D) | have |

4. Fill in the blanks with the correct answer selected from the choice given below.

Nobody ………. your department wanted to do that.

|  |  |
| --- | --- |
| (A) | at |
| (B) | about |
| (C) | in |
| (D) | for |

5. Fill in the blanks with the correct answer selected from the choice given below.

He was sure ………. her love.

|  |  |
| --- | --- |
| (A) | about |
| (B) | of |
| (C) | in |
| (D) | at |

**Direction** (Question No. 6 to 8):

6. Fill in the blanks with the correct answers selected from the choice given below:

I …………… tennis every Sunday morning.

|  |  |
| --- | --- |
| (A) | playing |
| (B) | play |
| (C) | am playing |
| (D) | am play |

7. Fill in the blanks with the correct answers selected from the choice given below:

Don’t make so much noise. Noriko …………… to study for her ESL test.

|  |  |
| --- | --- |
| (A) | try |
| (B) | tries |
| (C) | tried |
| (D) | is trying |

8. Fill in the blanks with the correct answers selected from the choice given below:

…………… many times every winter in Frankfurt.

|  |  |
| --- | --- |
| (A) | It snows |
| (B) | It snowed |
| (C) | It is snowing |
| (D) | It is snow |

**Direction** (Question No. 9 and 10):

9. Select the correct form of passive voice for the following.

I did this work.

|  |  |
| --- | --- |
| (A) | This work is done by me. |
| (B) | This work had been done by me. |
| (C) | This work was done by me. |
| (D) | The work is done by me. |

10. Select the correct form of passive voice for the following.

Who wrote “The Discovery of India”?

|  |  |
| --- | --- |
| (A) | By whom is “The Discovery of India” written? |
| (B) | By whom had been “The Discovery of India” written? |
| (C) | By whom was “The Discovery of India” written? |
| (D) | “The Discovery of India” was written by whom? |

**Direction** (Question No. 11 and 12):

11. Select the most appropriate contextual meaning for the following underlined words.

The event took place in December.

|  |  |
| --- | --- |
| (A) | started |
| (B) | occurred |
| (C) | functioned |
| (D) | sanctioned |

12. Select the most appropriate contextual meaning for the following underlined words.

The three day annual festival was held in Delhi.

|  |  |
| --- | --- |
| (A) | regular |
| (B) | happening every year |
| (C) | special |
| (D) | interesting |

**Direction** (Question No. 13 and 14):

13. Select the correct form of ACTIVE VOICE for the following.

The patients will be examined by a group of doctors.

|  |  |
| --- | --- |
| (A) | A group of doctors will examine the patients. |
| (B) | A group of doctors examine the patients. |
| (C) | Doctors will examine the patients. |
| (D) | The doctors can examine the patients. |

14. Select the correct form of ACTIVE VOICE for the following.

Where was her mobile hidden by you?

|  |  |
| --- | --- |
| (A) | Where had you hidden her mobile? |
| (B) | Where did you hide her mobile? |
| (C) | Where had you been hiding her mobile? |
| (D) | Where will you hide her mobile? |

**Direction** (Question No. 15 and 16):

15. Select the correct question tag for the following:

She isn’t Australian, …………...?

|  |  |
| --- | --- |
| (A) | is she |
| (B) | does she |
| (C) | isn’t she |
| (D) | can she |

16. Select the correct question tag for the following:

She doesn’t speak Spanish, …………...?

|  |  |
| --- | --- |
| (A) | is she |
| (B) | won’t she |
| (C) | can’t she |
| (D) | does she |

**Direction** (Question No. 17 and 18):

17. Select the word which is the most similar in meaning for the following.

Spinster

|  |  |
| --- | --- |
| (A) | an ugly lady |
| (B) | a morose woman |
| (C) | an unmarried woman |
| (D) | an old woman |

18. Select the word which is the most similar in meaning for the following.

Expel

|  |  |
| --- | --- |
| (A) | send out |
| (B) | laugh at |
| (C) | irritate |
| (D) | dismiss |

**Direction** (Question No. 19 and 20): Three of the four words given below are spelt wrongly.

19. Select the word that spelt correctly.

|  |  |
| --- | --- |
| (A) | Entrepreneurship |
| (B) | Enterprenership |
| (C) | Unterpreneurship |
| (D) | Enterpernership |

20. Select the word that spelt correctly.

|  |  |
| --- | --- |
| (A) | Tommorow |
| (B) | Tomorrow |
| (C) | Tommrow |
| (D) | Tommorrow |

21. The number of ways four boys can be seated around a round-table in four chairs of different colours is

|  |  |
| --- | --- |
| (A) | 24 |
| (B) | 12 |
| (C) | 23 |
| (D) | 64 |

22. The function  increases in the interval

|  |  |
| --- | --- |
| (A) | (1, ∞) |
| (B) | (, ∞) |
| (C) | (, ∞) |
| (D) | (0, ∞) |

23. Angle of intersection of the curve  and  is equal to

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

24.  is equal to

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

25.  is equal to

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

26. The solution of the differential equation  is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

27. The solution of the differential equation  is  Then *c*1 is

|  |  |
| --- | --- |
| (A) | 1 |
| (B) |  |
| (C) |  |
| (D) | 2 |

28. If the value of the determinant  is positive, then

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

29. The order and degree of the differential equation  are respectively

|  |  |
| --- | --- |
| (A) | 1, 2 |
| (B) | 2, 1 |
| (C) | 2, 2 |
| (D) | 3, 2 |

30. The solution of  is

|  |  |
| --- | --- |
| (A) | [8], [6] |
| (B) | [6], [14] |
| (C) | [6], [13] |
| (D) | [8], [14], [16] |

31. The value of *x* that satisfies , is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

32. is equal to

|  |  |
| --- | --- |
| (A) | 1 |
| (B) |  |
| (C) | 2 |
| (D) | 4 |

33. For any two sets *A* and *B*,  equals

|  |  |
| --- | --- |
| (A) | *B* |
| (B) |  |
| (C) |  |
| (D) |  |

34. A polygon has 44 diagonals. The number of its sides is

|  |  |
| --- | --- |
| (A) | 10 |
| (B) | 11 |
| (C) | 12 |
| (D) | 13 |

35. The number of natural numbers between 17 and 80 which are divisible by 6 is

|  |  |
| --- | --- |
| (A) | 21 |
| (B) | 11 |
| (C) | 63 |
| (D) | 42 |

36. The sum of all even natural numbers less than 75 is

|  |  |
| --- | --- |
| (A) | 1406 |
| (B) | 1046 |
| (C) | 1480 |
| (D) | 1840 |

37. The sum 6 **+** 15 **+** 24 **+** 33 **+** … **+** 105 is

|  |  |
| --- | --- |
| (A) | 666 |
| (B) | 333 |
| (C) | 999 |
| (D) | 444 |

38. The sum up to *n* terms is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

39. If  find the value 

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

40. The value of  is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

41. Let  Then is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) | 0 |

42. If    then is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

43. Let  be 3 vectors, such that  ,   Then  is equal to

|  |  |
| --- | --- |
| (A) | 0 |
| (B) |  |
| (C) | 7 |
| (D) | 1 |

44. The angle between the planes 

|  |  |
| --- | --- |
| (A) | 30° |
| (B) | 60° |
| (C) | 45° |
| (D) | 90° |

45. The particular integral of the differential equation  is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

46. If  then the value of *θ* in the first quadrant is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

47. The value of  is

|  |  |
| --- | --- |
| (A) | positive |
| (B) | 1 |
| (C) | 0 |
| (D) | negative |

48.  is equal to

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

49. The solution of the differential equation  is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

50. A tetrahedron has vertices at    and . Then the angle between the faces  and is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

51. If , then 

|  |  |
| --- | --- |
| (A) | *A* |
| (B) | *I* |
| (C) | 0 |
| (D) | 5*I* |

52. If  is identity matrix of order 3, then 

|  |  |
| --- | --- |
| (A) | 0 |
| (B) | 3*I*3 |
| (C) | *I*3 |
| (D) | 2*I*3 |

53. For two sets *A* and *B*,  and Then minimum number of elements in  is equal to

|  |  |
| --- | --- |
| (A) | 4 |
| (B) | 6 |
| (C) | 2 |
| (D) | 1 |

54. The marks out of 40 in a class containing 15 students in a test are

16, 25, 35, 20, 0, 12, 30, 22, 5, 8, 4, 38, 32, 2, 1.

Then the median score is:

|  |  |
| --- | --- |
| (A) | 16 |
| (B) | 30 |
| (C) | 22 |
| (D) | 7 |

55. The period of the function  is

|  |  |
| --- | --- |
| (A) | *π* |
| (B) | 2*π* |
| (C) | 3*π* |
| (D) | 6*π* |

56. If *α* and *β*  are roots of  then equation with roots   is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

57. The equation of the line through (3, 4) and parallel to the line  is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

58. The members of the family of lines  where   pass through the point

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) | (1, 1) |
| (D) |  |

59. If   and  then

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

60. The value of the determinant  is equal to

|  |  |
| --- | --- |
| (A) | 0 |
| (B) | 1 |
| (C) |  |
| (D) | 2 |

61.  is equal to

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

62. If  then

|  |  |
| --- | --- |
| (A) | where *n* is an integer |
| (B) | where *n* is an integer |
| (C) | where *n* is an integer |
| (D) | where *n* is an integer |

63. If  and , then  is equal to

|  |  |
| --- | --- |
| (A) | 4 |
| (B) | 8 |
| (C) | 16 |
| (D) | 32 |

64. If  then the value of *k* is equal to

|  |  |
| --- | --- |
| (A) | 0 |
| (B) | 1 |
| (C) |  |
| (D) | 2 |

65. The general solution of  is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

66. The angle between the planes  and  is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

67. The vector with the initial point (3, 2) and the terminal point  is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

68. Five horses are in a race. Mr. A has selected two of the horses at random and bets on them. The probability that Mr. A selected a winning horse is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

69.  is equal to

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

70. The solution of   and  at *x* = 0 is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

ENGINEERING MECHANICS

(FINAL)

71. The dimensional formula ML2T–3 represents

|  |  |
| --- | --- |
| (A) | work |
| (B) | power |
| (C) | force |
| (D) | momentum |

72. Newton’s first law of motion gives the concept of

|  |  |
| --- | --- |
| (A) | work |
| (B) | force |
| (C) | inertia |
| (D) | energy |

73. A system of three forces acts on a body and keeps it in equilibrium. The forces need to be

|  |  |
| --- | --- |
| (A) | coplanar only |
| (B) | concurrent only |
| (C) | coplanar as well as concurrent |
| (D) | coplanar but may or may not be concurrent |

74. The magnitude of two forces is such that when acting at right angles produce a resultant force of  and when acting at 60° produce a resultant equal to . The forces have a magnitude of

|  |  |
| --- | --- |
| (A) | and |
| (B) | 4 and |
| (C) | 2 and 4 |
| (D) | 2 and |

75. A car travels from one station to another along a straight road. First half of the distance is covered with velocity 60 km/hr and the second half is covered with velocity 90 km/hr. The average speed of the car is

|  |  |
| --- | --- |
| (A) | 72 km/hr |
| (B) | 75 km/hr |
| (C) | 78 km/hr |
| (D) | None of the above |

76. A particle starts with a velocity of 2 m/s and moves on a straight line track with retardation of 0.1 m/s2. The time at which the particle is 15 m from the starting point would be

|  |  |
| --- | --- |
| (A) | 10 s |
| (B) | 20 s |
| (C) | 40 s |
| (D) | 60 s |

77. A train travels between two stations 20 km apart in 24 minutes. During the journey, the train accelerates uniformly from some distance and then has a uniform retardation. The maximum velocity attained by the train during the journey will be

|  |  |
| --- | --- |
| (A) | 80 km/hr |
| (B) | 100 km/hr |
| (C) | 125 km/hr |
| (D) | 150 km/hr |

78. A block slides down a smooth inclined plane (*θ* = 30°) in time *t* after having released from its top. An identical block on being released from the same point and falling freely will reach the ground in time

|  |  |
| --- | --- |
| (A) | *t*/3 |
| (B) |  |
| (C) | *t*/2 |
| (D) | *t* |

79. Two metallic blocks having masses in the ratio 2:3 are made to slide down a frictionless inclined plane starting initially from rest position. When these blocks reach the bottom of the inclined plane, they will have their kinetic energies in the ratio

|  |  |
| --- | --- |
| (A) | 2:3 |
| (B) | 4:9 |
| (C) | 3:2 |
| (D) | 9:4 |

80. A particle undergoing rectilinear motion has a displacement prescribed by the relation: *s* = (*t*3 – 3.5*t*2 – 6*t* **+** 5) metre, where *t* represents the time. The acceleration of the particle, when its velocity is zero, will be

|  |  |
| --- | --- |
| (A) | –3 m/s2 |
| (B) | 11 m/s2 |
| (C) | 16 m/s2 |
| (D) | 25 m/s2 |

81. A rocket consumes fuel at the rate of 100 kg/s and exhaust gases are ejected at a speed of 45 km/s. The rocket would then experience a thrust (in MN) equal to

|  |  |
| --- | --- |
| (A) | 2.25 |
| (B) | 4.5 |
| (C) | 0.45 |
| (D) | 0.225 |

82. A body has linear momentum *P* and translational kinetic energy *E*. If momentum becomes 2*P*, the kinetic energy will have the value

|  |  |
| --- | --- |
| (A) | 0.5*E* |
| (B) | *E* |
| (C) | 2*E* |
| (D) | 4*E* |

83. A bomb of mass 20 kg explodes into two pieces of mass 5 kg and 15 kg. If the velocity of first part is 300 m/s, the velocity of other part would be

|  |  |
| --- | --- |
| (A) | zero |
| (B) | 30 m/s |
| (C) | 100 m/s |
| (D) | 900 m/s |

84. The bob of a pendulum of length 0.9 m is pulled to one side till the string makes an angle of 60° with the vertical and is released. If *g* = 10 m/s2, the bob acquires a maximum velocity of

|  |  |
| --- | --- |
| (A) | 1.5 m/s |
| (B) | 3.0 m/s |
| (C) | 4.7 m/s |
| (D) | 6.3 m/s |

85. A particle of mass 0.1 kg is moving at 2 m/s towards another particle of mass 0.2 kg at 4 m/s. Upon collision, it reverses its direction but continues moving with the same speed. The coefficient of restitution is about

|  |  |
| --- | --- |
| (A) | 0.28 |
| (B) | 0.35 |
| (C) | 0.66 |
| (D) | 0.81 |

86. Two balls are projected from the same point making angles of 60° and 30° with the vertical axis. If both the balls are to attain the same height, the ratio of speed of projection *V*1/*V*2 should be

|  |  |
| --- | --- |
| (A) | 1:2 |
| (B) | 1:1 |
| (C) | 1: |
| (D) | :1 |

87. A projectile will cover the maximum vertical distance in a minimum time when the angle of projection is

|  |  |
| --- | --- |
| (A) | 30° |
| (B) | 45° |
| (C) | 60° |
| (D) | 90° |

88. A particle executes simple harmonic motion with an amplitude of 3 cm and time period of 6 seconds. Its maximum velocity in cm/s will be

|  |  |
| --- | --- |
| (A) | *π*/2 |
| (B) | *π* |
| (C) | 2*π* |
| (D) | 3*π* |

89. The oscillation of a particle is represented by the equation: *x* = 3.cos(0.25.*π.t*), where *t* is the time in seconds. Then, the time taken by the particle to move from position of equilibrium to maximum displacement is

|  |  |
| --- | --- |
| (A) | 0.5 s |
| (B) | 1 s |
| (C) | 2 s |
| (D) | 3 s |

90. Upon rotation from initially rest position, the radius vector of a body executes angular rotation *θ* prescribed by the relation: *θ* = 4*t*3 – 3*t*2 **+** 2*t* **+** 6. The angular acceleration in radian/s2 of the body at time *t* = 2 second is

|  |  |
| --- | --- |
| (A) | 38 |
| (B) | 42 |
| (C) | 52 |
| (D) | 30 |

91. The speed of a particle moving in a circle of radius 10 cm changes from 1.5 *π* rad/s to 5 *π* rad/s in 2.2 seconds. The corresponding linear acceleration (cm/s2) of the particle is

|  |  |
| --- | --- |
| (A) | 25 |
| (B) | 32.5 |
| (C) | 50 |
| (D) | 65 |

92. The flywheel of a steam engine has a radius of gyration of 1 m and a mass of 2500 kg. The starting torque of the engine is 1500 Nm and remains constant. The angular acceleration of the flywheel in rad/s2 is

|  |  |
| --- | --- |
| (A) | 0.6 |
| (B) | 0.83 |
| (C) | 1.2 |
| (D) | 1.67 |

93. A motor cyclist goes around a circular track of 440 m length in 20 seconds. The cyclist should then make an angle with vertical equal to about: (Take *g* = 9.8 m/s2)

|  |  |
| --- | --- |
| (A) | 18° |
| (B) | 35° |
| (C) | 47° |
| (D) | 59° |

94. The position of centre of gravity (CG) of a solid hemisphere of radius *r* lies on the central radius at a distance of

|  |  |
| --- | --- |
| (A) | (2/3)*r* |
| (B) | (3/4)*r* |
| (C) | (3/8)*r* |
| (D) | (1/2)*r* |

95. The moment of inertia of a rectangular element (*b* **×** *h*) about an axis coincident with side *b* would be

|  |  |
| --- | --- |
| (A) | *bh*3/12 |
| (B) | *bh*3/6 |
| (C) | *bh*3/3 |
| (D) | 2*bh*3/3 |

96. The moment of inertia of a sphere of mass *m* and radius *r* about diameter as axis is given by

|  |  |
| --- | --- |
| (A) | (2/3)*mr*2 |
| (B) | (2/5)*mr*2 |
| (C) | (1/2)*mr*2 |
| (D) | (3/5)*mr*2 |

97. A mass of 200 kg is resting on a rough inclined plane of 30 degree. If the coefficient of friction is , the least force acting parallel to the plane to keep the mass in equilibrium is: (Take *g* = 9.8 m/s2)

|  |  |
| --- | --- |
| (A) | 0 N |
| (B) | 980 N |
| (C) | 1425 N |
| (D) | 1960 N |

98. The number of equilibrium conditions for a body subjected to a system of non-coplanar, non-concurrent force system is

|  |  |
| --- | --- |
| (A) | 2 |
| (B) | 3 |
| (C) | 9 |
| (D) | 6 |

99. If two equal forces of magnitude *P* act at an angle *θ*, their resultant will be

|  |  |
| --- | --- |
| (A) | *P* cos2(*θ*/2) |
| (B) | *P* cos(*θ*/2) |
| (C) | *2P* tan(*θ*/2) |
| (D) | *2P* cos(*θ*/2*)* |

100. The motion of a particle along a straight line is given by where *x* is in m and *t* is in seconds. The acceleration of the particle at s would be

|  |  |
| --- | --- |
| (A) | 6 m/s2 |
| (B) | –6 m/s2 |
| (C) | 4 m/s2 |
| (D) | –4 m/s2 |

101. A spherical ball weighing 30 N, suspended from the ceiling using a string, is pulled to one side by a horizontal force as shown. If the string makes an angle 30° with the vertical, tension in the string is

30o

|  |  |
| --- | --- |
| (A) | 20 N |
| (B) | 30 N |
| (C) | 30 N |
| (D) | 60 N |

102. A simply supported beam AB carries a concentrated load at a point C on the beam such that reaction at A and B are in the ratio 1:2. The ratio of the distance AC and CB is

|  |  |
| --- | --- |
| (A) | 1:2 |
| (B) | 2:1 |
| (C) | 1:3 |
| (D) | 3:1 |

103. The displacement of a particle moving with simple harmonic motion is given by *x* = 6 sin(4*t*). The time period of the system is

|  |  |
| --- | --- |
| (A) | 0.2s |
| (B) | 0.4s |
| (C) | 0.5s |
| (D) | 0.6s |

104. A pulley of diameter 30 cm is keyed to a shaft which rotates at 180 rpm. The linear velocity of a point on the periphery of the pulley is

|  |  |
| --- | --- |
| (A) | 90 cm/s |
| (B) | 180cm/s |
| (C) | 270cm/s |
| (D) | 360cm/s |

105. If *θ* is the angle of friction, coefficient of friction is

|  |  |
| --- | --- |
| (A) | sin *θ* |
| (B) | cos *θ* |
| (C) | tan *θ* |
| (D) | cot *θ* |

106. The rotational speed of a flywheel is found to reduce from 180 rpm to 120 rpm in 10 seconds. The angular retardation of the flywheel is

|  |  |
| --- | --- |
| (A) | 0.1rad/s2 |
| (B) | 0.2rad/s2 |
| (C) | 0.3rad/s2 |
| (D) | 0.4rad/s2 |

107. A spring-mass system has a mass of 20 kg and stiffness 720 N/m. The natural frequency of the system is

|  |  |
| --- | --- |
| (A) | 4 rad/s |
| (B) | 5 rad/s |
| (C) | 6 rad/s |
| (D) | 7 rad/s |

108. The moment of inertia of the shaded portion about AB is

A

6 cm

4 cm

10 cm

B

|  |  |
| --- | --- |
| (A) | 3120 cm4 |
| (B) | 2340 cm4 |
| (C) | 780 cm4 |
| (D) | 260 cm4 |

109. A bullet weighing 200 g is fired horizontally with a velocity of 30 m/s from a gun of weight 100 kg. The velocity with which the gun will recoil is

|  |  |
| --- | --- |
| (A) | 0.06 m/s |
| (B) | 0.6 m/s |
| (C) | 6 m/s |
| (D) | 60 m/s |

110. The flywheel of an engine weighs 1000 kg and has a radius of gyration of 50 cm. The angular acceleration of the wheel when it is subjected to a torque of 10 kNm is

|  |  |
| --- | --- |
| (A) | 20 rad/s2 |
| (B) | 40 rad/s2 |
| (C) | 50 rad/s2 |
| (D) | 25 rad/s2 |

ENGINEERING GRAPHICS

(FINAL)

111. The length to width ratio of a drawing sheet is

|  |  |
| --- | --- |
| (A) |  |
| (B) | 1:2 |
| (C) |  |
| (D) |  |

112. The type of line used for representing dimension line is:

|  |  |
| --- | --- |
| (A) | continuous thick line |
| (B) | continuous thin line |
| (C) | dashed thick line |
| (D) | chain thin line |

113. The included angle between two adjacent sides of a regular polygon with ‘*n*’ number of sides is equal to

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

114. In an ellipse the ratio between major axis and minor axis is 3:2. If the length of the major axis is 140 mm, what is the shortest distance between the focus of the ellipse and one end of the minor axis?

|  |  |
| --- | --- |
| (A) | 140 mm |
| (B) | 70 mm |
| (C) | 94 mm |
| (D) | 28 mm |

115. Name of the curve generated by a fixed point on the circumference of a circle which rolls without slipping along a fixed straight line is

|  |  |
| --- | --- |
| (A) | involute |
| (B) | cycloid |
| (C) | helix |
| (D) | spiral |

116. Perpendicular distance of the plan of a point from XY is equal to

|  |  |
| --- | --- |
| (A) | the distance of the point from HP |
| (B) | the distance of the point from VP |
| (C) | the distance of the point from XY |
| (D) | None of the above |

117. For a straight line of length 50 mm, if one end is 10 mm above HP and the other end is 40 mm above HP, its plan length will be

|  |  |
| --- | --- |
| (A) | 50 mm |
| (B) | 10 mm |
| (C) | 30 mm |
| (D) | 40 mm |

118. In the first angle projection, the right end view is drawn

|  |  |
| --- | --- |
| (A) | on the right side of the elevation |
| (B) | on the left side of the elevation |
| (C) | on the top of elevation |
| (D) | on the bottom of elevation |

119. Regarding orthographic projection, which of the following statements is correct?

|  |  |
| --- | --- |
| (A) | Projectors are parallel to each other |
| (B) | Projectors are perpendicular to the plane of projection |
| (C) | Isometric projection is a sub division |
| (D) | All the above |

120. Hatching line used to indicate a section of an object is a

|  |  |
| --- | --- |
| (A) | continuous thin line |
| (B) | continuous thick line |
| (C) | dashed thick line |
| (D) | chain thin line |

121. The section obtained by cutting a right circular cone by a section plane inclined to the axis, containing the apex of the cone and cutting the base circle is

|  |  |
| --- | --- |
| (A) | circle |
| (B) | ellipse |
| (C) | isosceles triangle |
| (D) | parabola |

122. Auxiliary vertical plane is

|  |  |
| --- | --- |
| (A) | inclined to both HP and VP |
| (B) | perpendicular to HP and inclined to VP |
| (C) | perpendicular to VP and inclined to HP |
| (D) | perpendicular to both HP and VP |

123. When a line is parallel to both HP and VP

|  |  |
| --- | --- |
| (A) | only the side view gives true length |
| (B) | only the top view gives true length |
| (C) | only the front view gives true length |
| (D) | both front and top views give true length |

124. When the end projectors of a line inclined to both HP and VP coincide, the line lies in

|  |  |
| --- | --- |
| (A) | HP |
| (B) | VP |
| (C) | the joint between HP and VP |
| (D) | a plane perpendicular to both HP and VP |

125. If the top view and front view of a point *K* coincides and is below *xy* line, the point *K* is

|  |  |
| --- | --- |
| (A) | in III quadrant |
| (B) | in II quadrant |
| (C) | in I quadrant |
| (D) | in IV quadrant |

126. If the traces of a line coincide, which statement is true?

|  |  |
| --- | --- |
| (A) | The line makes same inclinations with HP and VP |
| (B) | All points on the line are equidistant from HP and VP |
| (C) | The line is lying on HP |
| (D) | The extension of the line meet the joint between HP and VP |

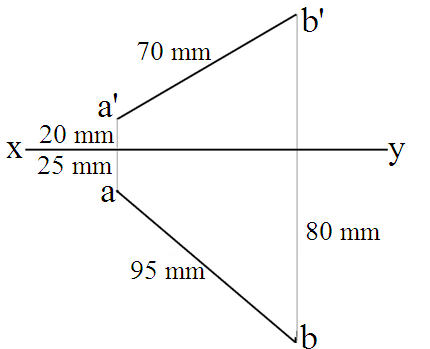
127. A line AB of length 10 cm measures 7.2 cm in the top view and 8.1 cm in the front view. What is the inclination of the line AB to HP?

|  |  |
| --- | --- |
| (A) | 44° |
| (B) | 46° |
| (C) | 36° |
| (D) | 54° |

128. End A of a line AB is 30 mm above HP and 30 mm behind VP. End B is 30 mm above HP and 50 mm in front of VP. The projectors of A and B are 60 mm apart. Where is its vertical trace?

|  |  |
| --- | --- |
| (A) | 30 mm above HP |
| (B) | 50 mm below HP |
| (C) | 70 mm in front of VP |
| (D) | 80 mm behind VP |

129. The projections of a line AB are give here (not to scale).



True length of line AB is

|  |  |
| --- | --- |
| (A) | 70 mm |
| (B) | 80 mm |
| (C) | 95 mm |
| (D) | None of the above |

130. A cube is resting on HP on a face and the front view and end view are geometrically the same when compared with top view. Which statement is true?

|  |  |
| --- | --- |
| (A) | The cube has one side parallel to VP |
| (B) | The cube has one side making 30° to VP |
| (C) | The cube has one side making 60° to VP |
| (D) | All the above |

131. A cube is resting on HP on an edge which is parallel to VP. Which statement is true?

|  |  |
| --- | --- |
| (A) | Front view is a square |
| (B) | Top view is a square |
| (C) | Side view is a square |
| (D) | None of the above |

132. A tetrahedron of 50 mm side has

|  |  |
| --- | --- |
| (A) | 4 axes of 50 mm length |
| (B) | 3 axes of  mm length |
| (C) | 4 axes of mm length |
| (D) | 4 axes of mm length |

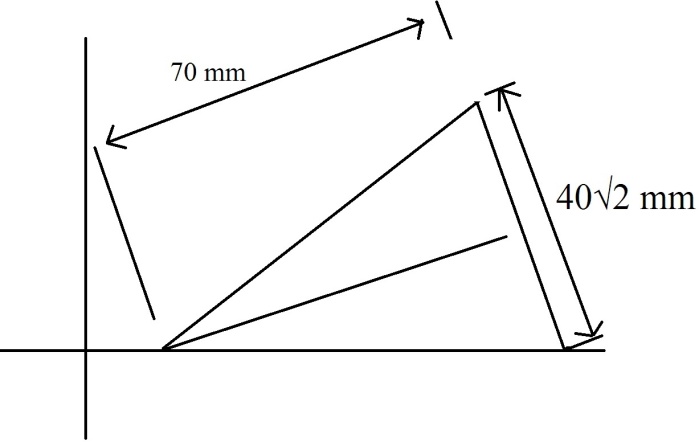
133. A hexagonal pyramid 30 mm side of base and 70 mm axis lies on HP on a triangular face. What is the inclination of the axis with HP?

|  |  |
| --- | --- |
| (A) | 30° |
| (B) | 60° |
| (C) | 25.4° |
| (D) | 20.4° |

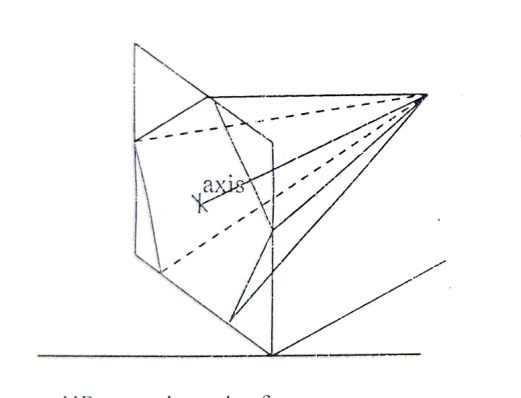
134. A cone of 50 mm diameter 60 mm axis stands on HP on a point of its base circle with axis parallel to VP and making 50° to HP. The plan length of the generator containing P will be

|  |  |
| --- | --- |
| (A) | 19.44 mm |
| (B) | 25 mm |
| (C) | 30 mm |
| (D) | 15 mm |

135. The drawing represents the end view from left of a square pyramid 40 mm side of base and 70 mm axis (I angle projection). How is the pyramid?

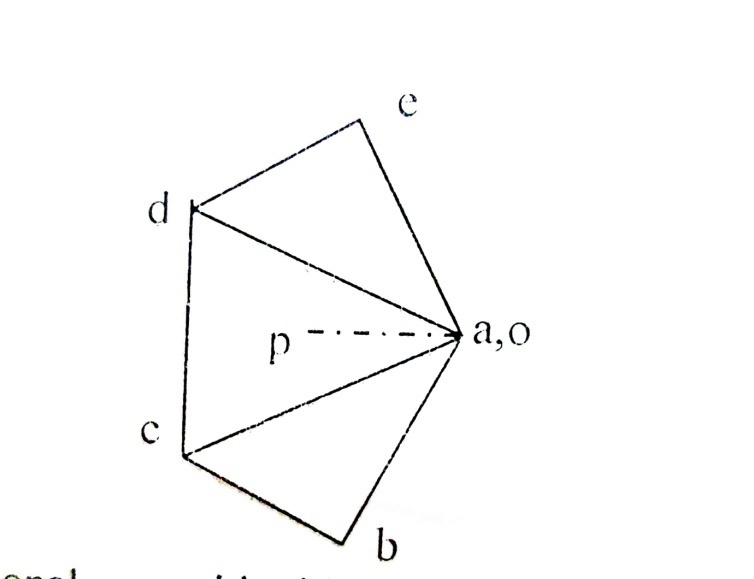


|  |  |
| --- | --- |
| (A) | Lying on HP on a triangular face with axis parallel to VP |
| (B) | Lying on HP on a slant edge with axis parallel to VP |
| (C) | Lying on HP on a triangular face with axis perpendicular to VP |
| (D) | None of the above |

136. When an octahedron is suspended on a string tied at a corner, its top view will be a

|  |  |
| --- | --- |
| (A) | hexagon |
| (B) | octagon |
| (C) | square |
| (D) | rhombus |

137. The drawing shows the top view of a polyhedron. Which statement is true for this position?

 X Y

|  |  |
| --- | --- |
| (A) | Pentagonal pyramid with apex nearer to HP and a slant edge perpendicular to HP |
| (B) | Pentagonal pyramid with apex nearer to HP and a triangular face perpendicular to VP and inclined to HP |
| (C) | Pentagonal pyramid with base perpendicular to VP inclined to HP such that the apex is nearer to HP |
| (D) | Pentagonal pyramid resting on HP on a corner of base with slant edge containing the corner vertical |

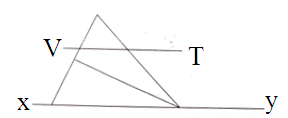
138. A corn of 50 mm diameter and 50 mm axis length rests on the ground on its base. What is the shape of the front view?

|  |  |
| --- | --- |
| (A) | Equilateral triangle |
| (B) | Circle |
| (C) | Isosceles triangle |
| (D) | Right angled triangle |

139. A cube resting on the ground on a face is cut by a cutting plane so that true shape is the biggest possible rhombus. What is the inclination of the cutting plane with the ground?

|  |  |
| --- | --- |
| (A) | 35.26° |
| (B) | 45° |
| (C) | 60° |
| (D) | 30° |

140. A hexagonal pyramid lying on HP on triangular face is cut by a plane parallel to HP as shown in figure. What is the true shape of section?



|  |  |
| --- | --- |
| (A) | Triangle |
| (B) | Trapezium |
| (C) | Hexagon |
| (D) | Square |

141. Perspective view of lines that are parallel to picture plane and ground plane

|  |  |
| --- | --- |
| (A) | will have actual lengths |
| (B) | will be parallel to ground line |
| (C) | will lie on horizon line |
| (D) | None of the above |

142. Central plane in perspective projection is a plane passing

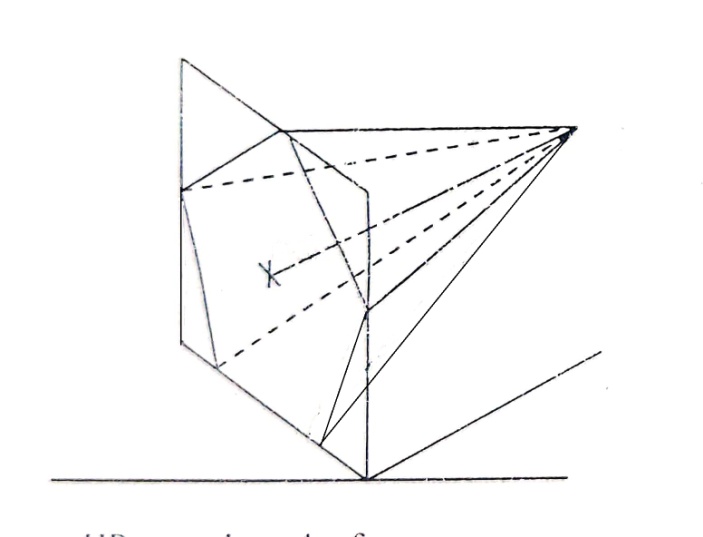
|  |  |
| --- | --- |
| (A) | through the axis of solid |
| (B) | through the eye parallel to ground plane |
| (C) | through the eye perpendicular to ground plane |
| (D) | through the midpoint of axis of solid |

143. The front view of station point lies on

|  |  |
| --- | --- |
| (A) | Ground line |
| (B) | Horizon line |
| (C) | Picture plane |
| (D) | Line of heights |

144. The reason for taking isometric lengths along the isometric axes is that the lengths along *x*, *y*, *z* axes are inclined to VP by

|  |  |
| --- | --- |
| (A) | 22.8° |
| (B) | 30° |
| (C) | 15° |
| (D) | 35.25° |

145. Isometric view of a pentagonal pyramid is shown here. Which statement is correct?

|  |  |
| --- | --- |
| (A) | It is lying on HP on a triangular face |
| (B) | It is lying on HP on a triangular face with axis parallel to VP |
| (C) | Its axes are perpendicular to VP |
| (D) | None of the above |

146. An area of 20 km2 is represented by a rectangle of 90 cm **×** 800 cm in a map. What is the RF?

|  |  |
| --- | --- |
| (A) | 3:5000 |
| (B) | 9:250 |
| (C) | 1:5000 |
| (D) | 1:3600 |

147. A backward reading vernier scale capable of reading up to 4 meters is divided into 4 parts of 1 meter each. The left most part is divided into 20 equal parts to represent 5 centimeter each. If the least count required is 5 mm, how will you divide the vernier scale?

|  |  |
| --- | --- |
| (A) | 10 msd divided into 20 equal parts |
| (B) | 11 msd divided into 12 equal parts |
| (C) | 11 msd divided into 10 equal parts |
| (D) | 21 msd divided into 20 equal parts |

148. What is meant by diameter of an ellipse?

|  |  |
| --- | --- |
| (A) | Major axis |
| (B) | Line with end points on the curve, passing through the centre |
| (C) | Distance between two foci |
| (D) | (Major axis **+** Minor axis)/2 |

149. A ball is thrown from the ground and it just passes over a tree 5 m tall and falls to the ground tracing on a parabolic path. The focus of the curve is on the ground itself. What is the size of the rectangle in which the curve can be drawn?

|  |  |
| --- | --- |
| (A) | 5 m **×** 5 m |
| (B) | 5 m **×** 10 m |
| (C) | 5 m **×** 20 m |
| (D) | 5 m **×** 25 m |

150. Which statement is true for a hyperbola?

|  |  |
| --- | --- |
| (A) | The auxiliary circles are drawn with F1 and F2 as centres |
| (B) | Asymptote is the tangent to the hyperbola at infinity |
| (C) | The asymptote divides the semi-transverse axis in the ratio of its eccentricity |
| (D) | The asymptote divides the transverse axis in the ratio of its eccentricity |

151. M10 grade of concrete approximates

|  |  |
| --- | --- |
| (A) | 1 : 3 : 6 mix |
| (B) | 1 : 1 : 2 mix |
| (C) | 1 : 2 : 4 mix |
| (D) | 1 : 1.5 : 3 mix |

152. IS. Sieve Nos. 10 mm and 4.75 mm are generally used for grading of

|  |  |
| --- | --- |
| (A) | coarse aggregates |
| (B) | fine aggregates |
| (C) | Neither (A) nor (B) |
| (D) | Both (A) and (B) |

153. A brick cut at the corner along the midpoint of adjacent sides, is called as

|  |  |
| --- | --- |
| (A) | queen closer |
| (B) | king closer |
| (C) | quoin |
| (D) | bat |

154. The type of foundation in which a cantilever beam is used for joining the two footings is

|  |  |
| --- | --- |
| (A) | raft footing |
| (B) | strap footing |
| (C) | combined footing |
| (D) | strip footing |

155. In chain surveying, tie lines are primarily provided

|  |  |
| --- | --- |
| (A) | to check the accuracy of the survey |
| (B) | to take offsets for detail survey |
| (C) | to avoid long offsets from chain lines |
| (D) | to increase the number of chain lines |

156. Pick up the method of surveying in which field observations and plotting proceed simultaneously, from the following

|  |  |
| --- | --- |
| (A) | plane table surveying |
| (B) | chain surveying |
| (C) | compass surveying |
| (D) | tachometric surveying |

157. The representative fraction of 1/2500 means that the scale is

|  |  |
| --- | --- |
| (A) | 1 cm = 2.5 m |
| (B) | 1 cm = 15 m |
| (C) | 1 cm = 25 m |
| (D) | 1 cm = 2.5 km |

158. A back sight

|  |  |
| --- | --- |
| (A) | is always taken on a point of known elevation or can be computed |
| (B) | is added to the known level to obtain the instrument height |
| (C) | taken on an inverted staff is treated as negative |
| (D) | All the above |

159. When concrete is to be laid under water, …………… is used.

|  |  |
| --- | --- |
| (A) | Rapid Hardening Cement |
| (B) | Ordinary Portland Cement |
| (C) | Quick Setting Cement |
| (D) | Low Heat Cement |

160. Stiffeners are used in plate girder

|  |  |
| --- | --- |
| (A) | to reduce the compressive stress |
| (B) | to reduce the shear stress |
| (C) | to take the bending stress |
| (D) | to avoid the buckling of web plate |

161. Which of the following is known as the inequality of Clausius?

|  |  |
| --- | --- |
| (A) | Cyclic integral of |
| (B) | Cyclic integral of |
| (C) | Cyclic integral of |
| (D) | Cyclic integral of |

162. If in the equation *pvn* = *C*, the value of *n* = ∝, then the process is called

|  |  |
| --- | --- |
| (A) | constant volume process |
| (B) | adiabatic process |
| (C) | constant pressure process |
| (D) | isothermal process |

163. The calorific value of gaseous fuel is expressed in

|  |  |
| --- | --- |
| (A) | kJ |
| (B) | kJ/kg |
| (C) | kJ/m2 |
| (D) | kJ/m3 |

164. Tool signature of a single point cutting tool consists of …………… dimensions.

|  |  |
| --- | --- |
| (A) | 4 |
| (B) | 5 |
| (C) | 6 |
| (D) | 7 |

165. Arbor is a component connected with

|  |  |
| --- | --- |
| (A) | lathe |
| (B) | milling |
| (C) | shaper |
| (D) | grinder |

166. Which among the following is not a frequency distribution?

|  |  |
| --- | --- |
| (A) | Bar chart |
| (B) | Pie chart |
| (C) | Control chart |
| (D) | Histogram |

167. Least count value of Vernier height gauge is

|  |  |
| --- | --- |
| (A) | 0.001 mm |
| (B) | 0.01 mm |
| (C) | 0.002 mm |
| (D) | 0.02 mm |

168. Which among the following is not related to inventory control?

|  |  |
| --- | --- |
| (A) | ABC |
| (B) | VED |
| (C) | TQM |
| (D) | FSN |

169. Which among the following is an ideal reversible closed thermodynamic cycle?

|  |  |
| --- | --- |
| (A) | Otto cycle |
| (B) | Diesel cycle |
| (C) | Carnot cycle |
| (D) | Brayton cycle |

170. A thermodynamic quantity equivalent to the total heat content of a system is

|  |  |
| --- | --- |
| (A) | Entropy |
| (B) | Enthalpy |
| (C) | Latent heat |
| (D) | Specific heat |

171. What is the condition of an electromagnetic induction?

|  |  |
| --- | --- |
| (A) | There must be a relative motion between the coil of wire and the galvanometer |
| (B) | There must be a relative motion between the galvanometer and a magnet |
| (C) | There must be a relative motion between the galvanometer and generator |
| (D) | There must be a relative motion between the coil of wire and a magnet |

172. Calculate the emf when the flux is given by 3 sin *t* **+** 4 cos *t* in a coil with 1 turn.

|  |  |
| --- | --- |
| (A) | 3 cos *t* – 4 sin *t* |
| (B) | –3 cos *t* **+** 4 sin *t* |
| (C) | 7 |
| (D) | 5 |

173. Which among the following is correct with regard to the use of MI Ammeter and MC Ammeter?

|  |  |
| --- | --- |
| (A) | Both are used to measure AC current only |
| (B) | Both are used to measure DC current only |
| (C) | Both are used to measure current and voltages |
| (D) | MI ammeter is used to measure both AC and DC but MC ammeter only to measure DC |

174. What are the coils in a Wattmeter?

|  |  |
| --- | --- |
| (A) | Armature and Field |
| (B) | There is only one coil |
| (C) | Series and shunt coils |
| (D) | Low Power Factor and High Power Factor coils |

175. The range of the Voltmeter can be increased by

|  |  |
| --- | --- |
| (A) | adding a high resistance series resistor to the pressure coil |
| (B) | adding a low resistance series resistor to the pressure coil |
| (C) | adding a high resistance parallel resistor to the pressure coil |
| (D) | adding a low resistance parallel resistor to the pressure coil |

176. Energy meters measure units in

|  |  |
| --- | --- |
| (A) | Current consumed |
| (B) | Power in Watts consumed |
| (C) | kWh units consumed |
| (D) | Voltage consumed |

177. Power in an RLC circuit is

|  |  |
| --- | --- |
| (A) | always zero |
| (B) | more than in a pure R circuit |
| (C) | equal to power consumed by R only |
| (D) | equal to power consumed by R, L and C |

178. Find the delta equivalent of 3 identical resistors of 3 ohms connected in star.

|  |  |
| --- | --- |
| (A) | 9 Ω in each leg |
| (B) | 2 Ω in each leg |
| (C) | It is different in each leg and so cannot calculate |
| (D) | 1 Ω in each leg |

179. On increasing the number of turns on a coil

|  |  |
| --- | --- |
| (A) | the inductance of the coil is increased |
| (B) | the inductance of the coil is decreased |
| (C) | the permeability of its core is increased |
| (D) | the permeability of its core is decreased |

180. Norton’ and Thevenin’s theorems are

|  |  |
| --- | --- |
| (A) | applicable to DC circuits only |
| (B) | dual of each other |
| (C) | not applicable for analyzing Transistors |
| (D) | applicable for finding only voltages across a resistor |

181. The forward characteristic of a diode has a slope of approximately 50 mA/V at a desired point. The approximate incremental resistance of the diode is:

|  |  |
| --- | --- |
| (A) | 50 Ω |
| (B) | 35 Ω |
| (C) | 20 Ω |
| (D) | 10 Ω |

182. In a half wave rectifier, the sine wave input is 200 sin 300*t*. The average value of output voltage is?

|  |  |
| --- | --- |
| (A) | 57.876 V |
| (B) | 67.453 V |
| (C) | 63.694 V |
| (D) | 76.987 V |

183. Which of the following is true for a bridge rectifier?

|  |  |
| --- | --- |
| (A) | The peak inverse voltage or PIV for the bridge rectifier is lower when compared to an identical center tapped rectifier |
| (B) | The output voltage for the center tapped rectifier is lower than the identical bridge rectifier |
| (C) | A transformer of higher number of coils is required for center tapped rectifier than the identical bridge rectifier |
| (D) | All of the above |

184. Commonly used electrical strain gauge is

|  |  |
| --- | --- |
| (A) | open type |
| (B) | closed type |
| (C) | unbounded type |
| (D) | bonded type |

185. What is a thermopile?

|  |  |
| --- | --- |
| (A) | Single thermocouple |
| (B) | Series-parallel connection of thermocouples |
| (C) | Parallel connection of thermocouples |
| (D) | Series of thermocouples |

186. Which equation represents AM waves?

|  |  |
| --- | --- |
| (A) | [1 **+** *m*(*t*)].*c*(*t*) |
| (B) | [1 – *m*(*t*)].*c*(*t*) |
| (C) | [1 **+** *m*(*t*)].2*c*(*t*) |
| (D) | [1 **+** 2*m*(*t*)].*c*(*t*) |

187. Why a sinusoidal signal is considered for analog communication?

|  |  |
| --- | --- |
| (A) | It moves in both positive and negative direction |
| (B) | It is positive for one half cycle |
| (C) | It is negative for one half cycle |
| (D) | It has infinite number of amplitudes in the range of values of the independent variable |

188. Relationship between amplitude and frequency is represented by

|  |  |
| --- | --- |
| (A) | Time-domain plot |
| (B) | Phase-domain plot |
| (C) | Frequency-domain plot |
| (D) | Amplitude-domain plot |

189. When will aliasing takes place

|  |  |
| --- | --- |
| (A) | Sampling signals less than Nyquist Rate |
| (B) | Sampling signals more than Nyquist Rate |
| (C) | Sampling signals equal to Nyquist Rate |
| (D) | Sampling signals at a rate which is twice of Nyquist Rate |

190. Which of the following is true about the temperature coefficient (TC) of the Zener diode?

|  |  |
| --- | --- |
| (A) | For Zener voltage less than 5 V, TC is negative |
| (B) | For Zener voltage around 5V, TC can be made zero |
| (C) | For higher values of Zener voltage, TC is positive |
| (D) | All of the above |

191. The small extremely fast, RAM’s are called as

|  |  |
| --- | --- |
| (A) | Cache |
| (B) | Heaps |
| (C) | Accumulators |
| (D) | Stacks |

192. Deadlock prevention is a set of methods

|  |  |
| --- | --- |
| (A) | to ensure that at least one of the necessary conditions cannot hold |
| (B) | to ensure that all of the necessary conditions do not hold |
| (C) | to decide if the requested resources for a process have to be given or not |
| (D) | to recover from a deadlock |

193. In any operating system, a process can be terminated due to

|  |  |
| --- | --- |
| (A) | normal exit |
| (B) | fatal error |
| (C) | killed by another process |
| (D) | All of the above |

194. A grammar that produces more than one parse tree for some sentence is called

|  |  |
| --- | --- |
| (A) | Ambiguous |
| (B) | Unambiguous |
| (C) | Regular |
| (D) | None of the above |

195. In assembly language, instructions like MOV or ADD are known as

|  |  |
| --- | --- |
| (A) | Opcodes |
| (B) | Operands |
| (C) | Commands |
| (D) | None of the above |

196. The network layer that handles units of data is known as

|  |  |
| --- | --- |
| (A) | bits |
| (B) | frames |
| (C) | packets |
| (D) | None of the above |

197. A network layer protocol of internet is

|  |  |
| --- | --- |
| (A) | ethernet |
| (B) | internet protocol |
| (C) | hypertext transfer protocol |
| (D) | None of the above |

198. An IPv6 address has a size of

|  |  |
| --- | --- |
| (A) | 32 bits |
| (B) | 64 bits |
| (C) | 128 bits |
| (D) | 265 bits |

199. In the programming language of C, which of these data types can have variable sizes?

|  |  |
| --- | --- |
| (A) | int |
| (B) | struct |
| (C) | float |
| (D) | double |

200. Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?

|  |  |
| --- | --- |
| (A) | CDMA |
| (B) | CSMA/CA |
| (C) | ALOHA |
| (D) | None of the above |

