LET - B.Tech 2024

Question Booklet Version: A

Qn. Booklet No: 24023 **Roll Number:** | | | | | | | | |

INSTRUCTIONS TO CANDIDATES

1. Fill in the OMR sheet carefully as per the instructions given on the back of the OMR Sheet / Admit Card. OMR sheet not correctly filled in will not be valued.

2. Write your Roll Number (all eight digits) and Version as **A** on the Question Booklet and on the left hand side of the OMR sheet (basic data part).

3. The examination consists of 120 Objective type multiple choice questions, which are to be answered in 120 minutes.

4. After opening the Question Booklet ensure that there are 120 Questions and that the printing of all the questions are legible. If there are any missing or illegibly printed questions, the matter may be reported to the Invigilator immediately

5. There are 4 options (A, B, C & D) for each objective type question. Mark the most appropriate answer to each question by blackening fully the corresponding bubble in the OMR sheet with a black/blue ink ball point pen. **For every correct answer 1 mark will be awarded. No deduction of mark will be made for incorrect answer and unanswered questions.** Marking of more than one bubble against a question number in the OMR sheet shall be considered as an incorrect answer. Erasing, overwriting, partial marking, etc. shall also be treated as incorrect answer.

6. Rough work and calculations can be made in the blank pages attached to the question booklet. Watch, Calculator, Mobile phone, Electronic instruments etc. shall not be allowed in the examination hall.

7. The OMR Sheet and the Hall Ticket should be returned to the Invigilator. The Counterfoil of the Hall Ticket and Question Booklet and Candidates copy of the OMR answer sheet can be retained by the candidate after the examination.

8. Answer keys will be published in the website **www.lbscentre.kerala.gov.in** after the examination. Complaints, if any, from the candidates regarding the questions, responses / probable answer may be sent to the Email id ddcc.lbs@kerala.gov.in within two calendar days from the date of publication of the answer keys. Complaints not substantiated with supporting documents will not be considered. However the decision of the experts regarding such complaints on the answer keys shall be final.

9. The Answer sheet of candidates who indulge in malpractice in any form shall not be valued.

10. The candidates will be allowed to leave the hall only after the completion of the examination time and after handing over the Answer sheet to the Invigilator.

A

24023 **120 MINUTES**

1. What is the proportion of SiO_2 present in the manufacturing of cement?
   A) 60 - 65% B) 17 - 25% C) 20 - 30% D) 10 - 15%

2. As per the National Building Code of India, educational buildings are categorized into which group based on occupancy criteria?
   A) Group A B) Group B C) Group C D) Group D

3. The ratio quotient obtained by dividing the total floor area on all floors by the area of the plot is known as:
   A) Floor area ratio B) Covered area ratio
   C) Build area ratio D) None of the above

4. What is the BIS recommended Standard size of Modular bricks?
   A) (19 cm x 9 cm x 9 cm) B) (20 cm x 10 cm x 10 cm)
   C) (16 cm x 10 cm x 5 cm) D) (12 cm x 10 cm x 12 cm)

5. What is the proportion of CaO present in the manufacturing of cement?
   A) 60 - 65% B) 17 - 25% C) 20 - 30% D) 10 - 15%

6. According to the Indian standard of cement, what is the permissible maximum limit for the total loss on ignition?
   A) > 1% B) > 2% C) > 4% D) > 5%

7. The quality building stone should possess adequate crushing strength to withstand the load of the superstructure. Typically, what minimum value should this crushing strength not fall below?
   A) 900 kg /cm^2 B) 1000 kg /cm^2
   C) 1200 kg /cm^2 D) 1500 kg /cm^2

8. The portion of brick obtained by cutting off the triangular piece between centre of one end and centre of one side?
   A) Bat B) Closer
   C) King closer D) Bevelled closer

9. As per Indian standard what is the specific gravity of cement?
   A) 2.16 B) 2.56 C) 3.16 D) 4.46

10. What are the complex compounds formed during the burning process that play a crucial role in the setting and hydration of cement?
    A) Hydration compounds B) Bogues compounds
    C) Calcium compounds D) Silica compounds

11. The common defect found in timber when the timber is stored for a longer time and may have a curve along its length:
A) Cup B) Bow C) Split D) Check

12. What percentage of tri-calcium aluminate (C3A) leads to an increase in resistance against sulphates?
A) Below 5% B) Above 50%
C) Between 50% to 75% D) Above75%

13. The uniformity coefficient of the soil is always:
A) Greater than or equal to 1 B) Zero
C) Equal to 1 D) None of these

14. What word is used to describe the moisture level in soil that marks the boundary between its liquid and plastic states?
A) Plastic limit B) Shrinkage limit
C) Liquid limit D) None of these

15. What is the term used for the ratio of the total volume of voids to the volume of the soil mass?
A) Void ratio B) Air content
C) Porosity D) None of these

16. The efficiency of a carnot engine operating with reservoir temperatures of 100^0 C and -23^0 C will be:
A) 33 % B) 67 % C) 40 % D) 80 %

17. Identify the correct statement:
A) Dual cycle is more efficient than otto cycle for a given compression ratio
B) Otto cycle is more efficient than diesel cycle for a given compression ratio
C) For a given compression ratio, both otto and diesel cycle have same Efficiency
D) None of these

18. Which of the following does **not** describe Diesel cycle?
A) Limited maximum temperature
B) High compression ratio
C) Constant volume heat addition
D) No spark plug needed

19. A two stroke cycle engines gives how many power strokes compared to four stroke cycle engine, at the same engine speed:
A) Half B) Same C) Double D) None of these

20. The ratio of brake power to the indicated power is called:
A) Mechanical efficiency
B) Overall efficiency
C) Indicated thermal efficiency
D) Volumetric efficiency

21. The lowest temperature at which the oil ceases to flow when cooled is known as:
A) Flash point B) Fire point C) Cloud point D) Pour point

22. Which battery is preferred for Electric vehicle?
A) Lead - acid B) Lithium – ion
C) Sodium –Sulphur D) Nickel – Cadmium

23. C.O.P can be expressed by which equation?
A) $\frac{Work\ done}{Refrigertion\ effect}$ B) $\frac{Refrigertion\ effect}{Work\ done}$
C) $\frac{Work\ done}{Heat\ transter}$ D) $\frac{Heat\ transfer}{Work\ done}$

24. On a Psychrometric chart, the adiabatic process follows:
A) Constant dry Bulb temperature lines
B) Constant relative humidity lines
C) Constant dew point temperature lines
D) Constant enthalpy lines

25. A pump is to deliver 1000 lit/ m^3 of water at a head of 120 m. If the pump efficiency is 50 %, what is the brake power of motor required to drive the pump?
A) 2 Kw B) 4 Kw C) 6 Kw D) 8 Kw

26. Which device is the driven member of a clutch?
A) Driver gear B) Driven gear
C) Pressure plate D) Flywheel

27. In a four high rolling mill, there are four rolls out of which:
A) One is working roll and three are backing roll
B) Two are working roll and two are backing up roll
C) Three are working roll and one backing up roll
D) All the four are working rolls

28. Soft solder consist of:
A) Copper and Tin B) Lead and Zinc
C) Lead and Tin D) Lead and Aluminium

29. The cutting tool in a milling machine is mounted on:
A) Spindle B) Column C) Knee D) Arbor

30. The full form of STL in roped prototyping:
A) Straight – lithography B) Streto – lithography
C) Stereo – lithography D) Straight - liprography

31. Nodal analysis is primarily based on:
A) Kirchhoff's Voltage Law B) Faraday's Law
C) Kirchhoff's Current Law D) Ohm's Law

32. The law which explains the principle of electromagnetic induction:
A) Ohm's Law B) Faraday's Law
C) Kirchhoff's Law D) Coulomb's Law

33. What is the unit of inductance?
A) Farad B) Henry C) Ohm D) Tesla

34. In a parallel circuit with resistors of equal value, the current through each resistor is?
A) Equal B) Different C) Zero D) Infinite

35. In an AC circuit containing only a capacitor, the current:
A) Leads the voltage by 90 degrees
B) Lags the voltage by 90 degrees
C) Is in phase with the voltage
D) None of these

36. The component which opposes changes in current in an electric circuit:
A) Resistor B) Capacitor
C) Transformer D) Inductor

37. If the RMS value of a sinusoidal current is 5A, its peak value is:
A) 3.54 A B) 5 A C) 7.07 A D) 10 A

38. The entire magnetic flux of one coil links the other coil the coefficient of coupling is:
A) Zero B) 0.5 C) 1 D) Infinity

39. An example of statically induced EMF is:
A) The voltage induced in the rotor of a generator
B) The EMF induced in a DC motor's armature
C) The voltage generated in a moving coil
D) The EMF induced in a transformer

40. The MMF in a magnetic circuit is given by:
A) H l B) N I C) B A D) V I

41. A series A.C. circuit has R = 4 Ω and XL= 5Ω. It will be expressed in the rectangular form as:
A) $(-4-j5)\ \Omega$ B) $(-4+j5)\ \Omega$
C) $(4+j5)\ \Omega$ D) $(4-j5)\ \Omega$

42. Reactive power in an AC circuit is measured in:
A) Volt-amperes reactive (VAR)
B) Volt-amperes (VA)
C) Watts (W)
D) None of the above

43. An alternating voltage is given by v = 200 sin314 t. Its peak value will be:
A) 121.4 V B) 282.8 V C) 141.4 V D) 200 V

44. The algebraic sum of instantaneous phase voltages in a three-phase circuit is equal to:
A) Zero B) Line voltage
C) Phase voltage D) None of these

45. In a delta connection, the line current is:
A) Equal to the phase current
B) $\sqrt{3}$ times the phase current
C) Half of the phase current
D) $\frac{1}{\sqrt{3}}$ times the phase current

46. Major portion of the current in an intrinsic semiconductor is caused by:
A) Valence band electrons B) Conduction band electrons
C) Holes in the valence band D) Thermally-generated electron

47. The most commonly used semiconducting material in electronic devices is:
A) silicon B) germanium C) copper D) carbon

48. For a silicon diode, the value of the forward bias voltage typically:
A) Must be greater than 0.3 V
B) Must be greater than 0.7 V
C) Depends on the width of the depletion region
D) Depends on the concentration of majority carriers

49. The width of depletion layer of a P-N junction:
A) Decreases with light doping
B) Increases with heavy doping
C) Increases under reverse bias
D) Is independent of applied voltage

50. The emitter of a transistor is generally doped heavily because it:
A) Must possess low resistance
B) Has to supply the charge carriers
C) Is the first region of the transistor
D) Has to dissipate maximum power

51. For a properly biased NPN transistor, most of the electrons from the emitter:
A) Recombines with holes in the base
B) Recombines in the emitter itself
C) pass through the base to the collector
D) Are stopped by the junction barrier

52. Avalanche breakdown is primarily dependent on the phenomenon of:
A) Collision B) Doping
C) Recombination D) Ionization

53. Silicon is preferred for the manufacturing of Zener diodes because it:
A) is relatively cheap B) has higher temperature and current capacity
C) needs lower doping level D) has lower break-down voltage

54. Zener diodes are used primarily as:
A) voltage regulators B) rectifiers
C) oscillators D) amplifiers

55. The basic reason for a Full Wave rectifier having twice the efficiency of a Half Wave rectifier is that:
A) It makes use of a transformer
B) Its ripple factor is much less
C) It utilizes both half cycle of the input
D) Its output frequency is double the line frequency

56. When a BJT is used in an amplifier circuit, it works:
A) in cut-off B) in saturation
C) well into saturation D) over the active region

57. The main reason for the variation of amplifier gain with frequency is:
A) The presence of both external and internal capacitances.
B) Due to interstage transformers
C) The logarithmic increase in its output power
D) The Miller effect

58. 100% modulation happens in Amplitude Modulation when carrier signal:
A) Frequency equals modulating signal frequency
B) Frequency exceeds modulating signal frequency
C) Amplitude is same as modulating signal amplitude
D) Amplitude exceeds modulating signal amplitude

59. The main disadvantage of Frequency Modulated transmission is its:
A) High static noise B) Limited line of sight range
C) Expensive equipment D) Adjacent channel interference

60. In an Amplitude Modulated wave with 100 percent modulation, each sideband carries how much amount of the total transmitted power.
A) one-half B) one-sixth C) one-third D) two-third

61. What is the correct syntax to declare a variable in C?
A) int a; B) var int a; C) int a: D) int a = 10;

62. Which of the following is a valid C variable name?
A) int B) 123variable C) variable_1 D) variable-1

63. What is the output of the following code?

```
int a = 5, b = 10;
printf("%d", a + b);
```

A) 5 B) 10 C) 15 D) None of these

64. Which of the following operators is used to get the address of a variable in C?
A) * B) & C) @ D) #

65. What is the output of the following code?

```
#include <stdio.h>
int main() {
    printf("%d", 5+10*3);
    return 0;
}
```

A) 45 B) 35 C) 15 D) 30

66. What is the size of an *int* data type in C?
A) 2 Bytes B) 4 Bytes
C) 8 Bytes D) It depends on the compiler

67. What is the output of the following code?

```
#include <stdio.h>
  int main() {
  int x = 10, y = 5;
  printf("%d", x | y);
 return 0;
}
```

A) 2 B) 5 C) 10 D) 15

68. Which of the following is used to input a string in C?
A) gets() B) scanf() C) printf() D) putchar()

69. What will be the output of the following code?

```
#include <stdio.h>
int main() {
    int a = 10;
    if (a < 20) {
      printf("a is less than 20\n");
    }
 return 0;
}
```

A) No output B) a is less than 20
C) Error D) None of these

70. Which of the following is **not** a valid storage class in C?
A) auto B) static C) register D) private

71. Which of the following functions is used to compare two strings in C?
A) strcmp() B) strcpy() C) strcat() D) strlen()

72. Which of the following statements about functions is true in C?
A) A function can have more than one return statement
B) A function cannot return a value
C) A function cannot call another function
D) Functions can only return integer values

73. Which of the following is the correct syntax to declare a constant in C?
A) const int a; B) int const a;
C) Both A and B D) None of these

74. What is the output of the following code?

```
#include <stdio.h>
int main() {
   int var = 10;
   int *ptr;
   ptr = &var;
   printf("%d", *ptr);
   return 0;
}
```

A) Address of var B) 10
C) Value of ptr D) Error

75. What will be the output of the following code?

```
#include <stdio.h>
int main() {
    int x = 5;
    int *ptr = &x;
   *ptr = 10;
   printf("%d", x);
   return 0;
}
```

A) 5 B) 10
C) Address of x D) Garbage value

76. If two equal forces of magnitude P act at a point with an included angle180°, their resultant will be:
A) P/2 B) P sin 90 C) Zero D) 2P

77. The forces, which do not meet at one point, but their lines of action lie on the same plane, are known as:
A) Coplanar non-concurrent forces
B) Coplanar concurrent forces
C) Concurrent forces
D) on-concurrent forces.

78. Find the magnitude of the two forces, such that if they act at right angles, their resultant is 10 N . But if they Act at 60°, their resultant is 13 N. Two resolved parts in two directions at right angles are equal:
A) 1N, 3N B) 1N, 2N C) 2N, 3N D) 2N, 2N

79. The process of splitting up the given force into a number of components, without changing its effect on the body is called:
A) Splitting of forces B) Resolution of a force
C) Force couple D) Balancing of couple

80. In which type of lever, the effort and load act on the opposite sides of the fulcrum:
A) Lever of first order B) Lever of second order
C) Lever of third order D) Lever of forth order

81. A framed structure is perfect if it contains members equal to:
(where n = number of joints in a frame)
A) n-1 B) 2n-1 C) 2n-2 D) 2n-3

82. The unit of moment of inertia of an area is:
A) kgm^2 B) m^3 C) kg/m^2 D) m^4

83. The unit of mass moment of inertia is:
A) Kg/m^2 B) Kgm^4 C) kgm^2 D) kg/m^3

84. The ratio of limiting friction to the normal reaction is defined as:
A) Angle of friction B) Angle of repose
C) Cone of friction D) Coefficient of friction

85. Which one of the following statements is **not** correct?
A) The algebraic sum of the forces, constituting the couple, is zero.
B) The algebraic sum of the moments of the forces, constituting the couple, about any point is the same, and equal to the moment of the couple itself.
C) A couple can be balanced by a single force.
D) A couple can be balanced only by a couple of opposite sense.

86. The Centre of gravity of right circular solid cone with height "h" is measured along the vertical axis from its base is:
A) h B) h/3 C) h/2 D) h/4

87. The distance through which a screw thread advances axially in one turn is:
A) Pitch B) Lead
C) Helix D) Depth of thread

88. The larger and smaller diameters of a differential wheel and axle are 80 mm and 70 mm respectively. The effort is applied to the wheel of diameter 250 mm. What is the velocity ratio?
A) 28 B) 48 C) 2 D) 3

89. The efficiency of a lifting machine entail in terms of the ratio of:
A) Its the mechanical advantage to its velocity ratio
B) Work done by it to the work done on it
C) It's output to input
D) All of the above

90. The efficiency of a lifting machine is kept constant, its velocity ratio is directly proportional to its:
A) Mechanical advantage B) Effort applied
C) Machine friction D) All of these

91. The value of c for which the system

$$x - cy + cz = 0$$
$$cx - y + cz = 0$$
$$cx + cy - z = 0$$

Has a non-trivial solution is:

A) 0 B) ± 1 C) ± 2 D) 3

92. The characteristic equation of the matrix $\begin{bmatrix} 1 & 0 & -2 \\ 2 & 0 & -3 \\ 1 & -1 & 2 \end{bmatrix}$ is:

A) $\lambda^3 - 3\lambda^2 + 3\lambda - 1 = 0$ B) $\lambda^3 - 3\lambda^2 - 3\lambda - 1 = 0$

C) $\lambda^3 - 3\lambda^2 + \lambda - 1 = 0$ D) $\lambda^3 - 3\lambda^2 + 2\lambda - 1 = 0$

93. Which of the following quadratic form is positive semi-definite?

A) $Q(x, y) = xy$ B) $Q(x, y) = x^2 - y^2$

C) $Q(x, y) = x^2 + 2xy + y^2$ D) $Q(x, y) = x^2 + xy$

94. If the eigen values of a 3×3 matrix A are $1, -1$ and 2. Then determinant of A is:

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

95. If $u = sin^{-1}\left(\frac{x}{y}\right) + tan^{-1}\left(\frac{y}{x}\right)$, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is:

A) $\frac{-y}{x^2+y^2}$ B) $\frac{y}{x^2+y^2}$ C) 0 D) 1

96. The value of $\lim_{(x,y)\to(2,0)}\left(\frac{y}{x+y-2}\right)$ is:

A) 0 B) 1 C) -1 D) Does not exist

97. The partial derivative of $f(x, y) = x^2y^3 + x^4y$ with respect to x at the point $(1, 1)$ is:

A) 6 B) 4 C) 3 D) 1

98. The relative maxima of $f(x, y) = x^3y^2(12 - x - y)$ for $x > 0,\ y > 0$ occurs at:

A) $(1, 2)$ B) $(2, 1)$ C) $(4, 6)$ D) $(6, 4)$

99. The series: $\sum_{n=1}^{\infty} \frac{2}{2^n + x}$

A) converges for all $x > 0$
B) converges when $0 < x < 1$ and diverges when $x > 1$
C) diverges when $0 < x < 1$ and converges when $x > 1$
D) diverges for all $x > 0$

100. The series $1 + \frac{1}{3} + \frac{1}{2 \times 9} + \frac{1}{3 \times 27} + \frac{1}{4 \times 81} \ldots$ converges to:

A) $\ln 2 - 1$ B) $\ln \frac{2}{3} - 1$ C) $\ln 3$ D) $\ln \frac{2}{3}$

101. The coefficient of x^2 in the Taylor series expansion of $f(x) = sin^2 x$ about $x = \frac{\pi}{2}$ is:

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

102. If $f(x) = \begin{cases} x, & -\pi < x < 0 \\ 1-x, & 0 < x < \pi \end{cases}$
has a fourier series expansion, then $f(0)$ is:

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) -1

103. A particle moves along the curve given by $x = 2t,\ y = 3t^2,\ z = 2t - 5$, where t is the time. The component of its velocity in the direction of $2\vec{\imath} + 2\vec{\jmath} + \vec{k}$ at $t = 1$ is:

A) 6 B) 3 C) 2 D) 1

104. The acceleration of a moving particle is given by $\vec{a}t + \vec{b}$. Then the movement of the particle when both velocity and displacement are zero at time $t = 0$ is given by:

A) $\vec{r} = \vec{a}t^3 + \vec{v}t^2$ B) $\vec{r} = \frac{1}{6}\vec{a}t^3 + \frac{1}{2}\vec{b}t^2$

C) $\vec{r} = \frac{1}{4}\vec{a}t^3 + \vec{b}t^2$ D) $\vec{r} = \frac{1}{6}\vec{a}t^3 + \frac{1}{6}\vec{b}t^2$

105. The directional derivative of $\phi\ (x, y, z) = xy^2z^2 + 4xy$ at (1, 0, 1) in the direction of $\vec{\imath} - 2\vec{\jmath} + \vec{k}$ is:

A) $-\frac{8}{3}$ B) $\frac{8}{3}$ C) $\frac{4}{3}$ D) $\frac{7}{3}$

106. Which of the following is **not** true?

A) $div\ (\phi f) = \phi\nabla.f + \nabla\phi.f$
B) $curl\ (\phi f) = \phi\nabla \times f + \nabla\phi \times f$
C) $curl\ curl\ f = grad\ div\ f + \nabla^2 f$
D) $div\ curl\ f = 0$

107. The divergence of $\phi\ (x, y, z) = x^2yz\vec{\imath} - 2xy\vec{\jmath} + 4z^2\vec{k}$ at (1, -1, 1) is:

A) 0 B) 2 C) -4 D) 4

108. The general solution of $x^2\frac{d^2y}{dx^2} - 4x\frac{dy}{dx} + 4y = 0$ is:

A) $y = (A + Bx)logx$ B) $y = Ax + Bx^4$

C) $y = Ax + Bx^{-4}$ D) $y = Ae^x + Be^{4x}$

109. The Laplace transform of $t \sin 2t$ is:

A) $\frac{4s}{(s^2+4)^2}$ B) $\frac{s}{(s^2+4)^2}$ C) $\frac{4}{(s^2+4)^2}$ D) $\frac{4s}{(s^2+4)}$

110. Which of the following property does **not** hold for Fourier Transforms?

A) If $F(s)$ and $G(s)$ are Fourier transforms of $f(x)$ and $g(x)$ respectively and a, b are constants, then $F(af(x) + bg(x)) = aF(s) + bG(s)$.

B) If $F(s)$ denote the complex Fourier transform of $f(x)$, then $F(af(x)) = \frac{1}{a} F\left(\frac{s}{a}\right), a \neq 0$.

C) If $F(s)$ denote the complex Fourier transform of $f(x)$, then $F(f(x-a)) = e^{isa}F(s)$.

D) If $F(s)$ denote the complex Fourier transform of $f(x)$, then $F(f(x)\cos ax) = F(s+a) + F(s-a)$.

Questions **111-115**. Read the passage and choose the most appropriate answer from the options provided.

Caterpillars have a sixth sense that most land-based animals do not. They can sense electric fields around them with small bristles called setae on its body — a feat called electroreception. British researchers have discovered this in laboratory experiments and their findings were published recently in the Proceedings of the National Academy of Sciences. They studied four species of caterpillars: cinnabar moth, scarce vapourer moth, European peacock butterfly, and common wasp.

111. The 'sixth sense' of caterpillars relates to the ------- of electric fields:
A) purpose B) pursuit C) prevalence D) perception

112. 'Electroreception; is considered a 'feat' because:
A) The setae function like feet
B) The bristles resemble nails
C) It is a significant achievement
D) It was discovered only recently

113. The mismatched pronouns in the second sentence of the passage:
A) Feet/feat B) Feat/fete C) They/its D) Around/on

114. The team of researchers belonged to:
A) The United Kingdom B) The United States
C) The United Emirates D) The United Scientists

115. The European peacock butterfly is a/an:
A) Mineral B) Insect C) Bird D) Primate

116. The adjective/qualifying word in the sentence, 'The provisional title of the novel is No Time to Live.'
A) Provisional B) Title C) Time D) Live

117. "I am off to visit the Browns." The speaker mentions a visit to:
A) A household whose members share the family name 'Brown'.
B) A family whose members have a brownish complexion
C) A family whose members have brown eyes
D) A family whose members have brown hair

118. The scholarship was made possible ------of an endowment by a generous donor. (Fill in the blanks, using the correct option)
A) instead B) because C) in spite D) bespoke

119. Rearrange the words (numbered 1-7) in the logical order of a sentence:
you we were to miss all beginning
1 2 3 4 5 6 7

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

120. Pick the correctly spelt word:
A) Impostor B) impertinant C) improudent D) impaltry

LET - B.Sc 24

Question Booklet Version: A

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5. There are 4 options (A, B, C & D) for each objective type question. Mark the most appropriate answer to each question by blackening fully the corresponding bubble in the OMR sheet with a black/blue ink ball point pen. **For every correct answer 1 mark will be awarded. No deduction of mark will be made for incorrect answer and unanswered questions.** Marking of more than one bubble against a question number in the OMR sheet shall be considered as an incorrect answer. Erasing, overwriting, partial marking, etc. shall also be treated as incorrect answer.

6. Rough work and calculations can be made in the blank pages attached to the question booklet. Watch, Calculator, Mobile phone, Electronic instruments etc. shall not be allowed in the examination hall.

7. The OMR Sheet and the Hall Ticket should be returned to the Invigilator. The Counterfoil of the Hall Ticket and Question Booklet and Candidates copy of the OMR answer sheet can be retained by the candidate after the examination.

8. Answer keys will be published in the website **www.lbscentre.kerala.gov.in** after the examination. Complaints, if any, from the candidates regarding the questions, responses / probable answer may be sent to the Email id ddcc.lbs@kerala.gov.in within two calendar days from the date of publication of the answer keys. Complaints not substantiated with supporting documents will not be considered. However the decision of the experts regarding such complaints on the answer keys shall be final.

9. The Answer sheet of candidates who indulge in malpractice in any form shall not be valued.

10. The candidates will be allowed to leave the hall only after the completion of the examination time and after handing over the Answer sheet to the Invigilator.

A

24024 **120 MINUTES**

1. Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$. Then the value of $A^3 - 5A^2$ is:

   A) $2A$ B) 0 C) I D) $A + I$

2. The value of c for which the system

$$x - cy + cz = 0$$
$$cx - y + cz = 0$$
$$cx + cy - z = 0$$

   Has a non-trivial solution is:

   A) 0 B) ± 1 C) ± 2 D) 3

3. The rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ is:

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

4. The characteristic equation of the matrix $\begin{bmatrix} 1 & 0 & -2 \\ 2 & 0 & -3 \\ 1 & -1 & 2 \end{bmatrix}$ is:

   A) $\lambda^3 - 3\lambda^2 + 3\lambda - 1 = 0$ B) $\lambda^3 - 3\lambda^2 - 3\lambda - 1 = 0$

   C) $\lambda^3 - 3\lambda^2 + \lambda - 1 = 0$ D) $\lambda^3 - 3\lambda^2 + 2\lambda - 1 = 0$

5. Let A be an $n \times n$ non-singular matrix. Then the system $Ax = b$ has:

   A) unique solution B) no solution

   C) two solutions D) infinite number of solutions

6. Let λ be a eigen velue of an orthogonal matrix A. Then the value of $|\lambda|$ is:

   A) 0 B) 3 C) 2 D) 1

7. Which of the following quadratic form is positive semi-definite?

   A) $Q(x, y) = xy$ B) $Q(x, y) = x^2 - y^2$

   C) $Q(x, y) = x^2 + 2xy + y^2$ D) $Q(x, y) = x^2 + xy$

8. If the eigen values of a 3×3 matrix A are $1, -1$ and 2. Then determinant of A is:

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

9. If $u = sin^{-1}\left(\frac{x}{y}\right) + tan^{-1}\left(\frac{y}{x}\right)$, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is:

   A) $\frac{-y}{x^2+y^2}$ B) $\frac{y}{x^2+y^2}$ C) 0 D) 1

10. The value of $\int_0^1 \int_{x^2}^{2-x} xydydx$ is:

A) $\frac{1}{8}$ B) $\frac{1}{4}$ C) $\frac{3}{8}$ D) $\frac{3}{4}$

11. The value of $\lim_{(x,y)\to(2,0)} \left(\frac{y}{x+y-2}\right)$ is:

A) 0 B) 1 C) -1 D) Does not exist

12. The absolute maximum value of the function $f(x) = x^3 - 2x^2 + 5$ in the interval $[-2, 2]$ is:

A) 5 B) 4 C) -11 D) $\frac{103}{27}$

13. The partial derivative of $f(x,y) = x^2y^3 + x^4y$ with respect to x at the point (1, 1) is:

A) 6 B) 4 C) 3 D) 1

14. The value of $\frac{dz}{dt}$ when $z = 3x^2y^3,\ x = t^4,\ y = t^2$ is:

A) $33t^{13}$ B) $42t^{13}$ C) $33t^{12}$ D) $42t^{12}$

15. The relative maxima of $f(x,y) = x^3y^2(12 - x - y)$ for $x > 0,\ y > 0$ occurs at:

A) (1, 2) B) (2, 1) C) (4, 6) D) (6, 4)

16. The cartisian coordinate of $(-1, 1)$ in polar coordinate system is:

A) $\left(\sqrt{2}, \frac{3\pi}{4}\right)$ B) $\left(1, \frac{3\pi}{4}\right)$ C) $\left(\sqrt{2}, \frac{7\pi}{4}\right)$ D) $\left(1, \frac{7\pi}{4}\right)$

17. The series: $\sum_{n=1}^{\infty} \frac{2}{2^n+x}$

A) converges for all $x > 0$
B) converges when $0 < x < 1$ and diverges when $x > 1$
C) diverges when $0 < x < 1$ and converges when $x > 1$
D) diverges for all $x > 0$

18. The sequence $\left\{\frac{n}{3^n}\right\}$:

A) converges to 1 B) converges to $\frac{1}{2}$
C) converges to 0 D) diverges

19. The series $1 + \frac{1}{3} + \frac{1}{2 \times 9} + \frac{1}{3 \times 27} + \frac{1}{4 \times 81}$ ... converges to:

A) $\ln 2 - 1$ B) $\ln \frac{2}{3} - 1$ C) $\ln 3$ D) $\ln \frac{2}{3}$

20. The series $1 + \frac{1}{2^2 x 3!} + \frac{1}{2^4 x 5!} + \frac{1}{2^6 x 7!} + \cdots$ converges to:

A) $e^{\frac{1}{2}} - e^{-\frac{1}{2}}$ B) $e^{\frac{1}{2}} - e^{-\frac{1}{2}} - 1$ C) $e^2 - e^{-2} - 2$ D) $e^2 - e$

21. The power series expression of $\ln\left(\frac{2x+2}{2x+1}\right)$ valid in the domain:

A) $(-1, 1)$ B) $(-1, \infty)$ C) $(-1, 0)$ D) $(-\infty, -1) \cup (0, \infty)$

22. The series $1 + \frac{2}{1!}\frac{x}{3} + \frac{2x5}{2!}\frac{x^2}{9} + \frac{2x5x8}{3!}\frac{x^3}{27} + \cdots$ converges to:

A) $\frac{1}{(1-x)^{\frac{2}{3}}}$ B) $\frac{1}{(1+x)^{\frac{2}{3}}}$ C) $\frac{1}{(1-x)^{\frac{3}{2}}}$ D) $\frac{1}{(1+x)^{\frac{3}{2}}}$

23. The coefficient of x^2 in the Taylor series expansion of $f(x) = sin^2 x$ about $x = \frac{\pi}{2}$ is:

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

24. If $f(x) = \begin{cases} x, & -\pi < x < 0 \\ 1 - x, & 0 < x < \pi \end{cases}$
has a fourier series expansion, then $f(0)$ is:

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) -1

25. A particle moves along the curve given by $x = 2t,\ y = 3t^2,\ z = 2t - 5$, where t is the time. The component of its velocity in the direction of $2\vec{\imath} + 2\vec{\jmath} + \vec{k}$ at $t = 1$ is:

A) 6 B) 3 C) 2 D) 1

26. If $\overrightarrow{r(t)} = 6t\vec{\imath} + t^2\vec{\jmath} + 4t\vec{k}$, then $\int_0^1 \vec{r} \cdot \frac{d\vec{r}}{dt}$ is:

A) 53 B) $\frac{51}{2}$ C) 51 D) $\frac{53}{2}$

27. The acceleration of a moving particle is given by $\vec{a}t + \vec{b}$. Then the movement of the particle when both velocity and displacement are zero at time $t = 0$ is given by:

A) $\vec{r} = \vec{a}t^3 + \vec{b}t^2$ B) $\vec{r} = \frac{1}{6}\vec{a}t^3 + \frac{1}{2}\vec{b}t^2$

C) $\vec{r} = \frac{1}{4}\vec{a}t^3 + \vec{b}t^2$ D) $\vec{r} = \frac{1}{6}\vec{a}t^3 + \frac{1}{6}\vec{b}t^2$

28. If $\vec{r} = x\vec{\imath} + \vec{\jmath} + z\vec{k}$ and $r = |\vec{r}|$, then $grad\ log|\vec{r}|$ is:

A) 0 B) $\frac{\vec{r}}{r}$ C) $\frac{\vec{r}}{r^2}$ D) $r\vec{r}$

29. The directional derivative of $\phi\ (x, y, z) = xy^2z^2 + 4xy$ at $(1, 0, 1)$ in the direction of $\vec{\imath} - 2\vec{\jmath} + \vec{k}$ is:

A) $-\frac{8}{3}$ B) $\frac{8}{3}$ C) $\frac{4}{3}$ D) $\frac{7}{3}$

30. The value of the constant a so that the scalar point function $\phi\,(x, y, z) = axy^2 + 4ayz - 8z^2x^3$ at (1, 2, -1) has a maximum directional derivative 64 in the direction parallel to z – axis is:

A) -6 B) 0 C) 6 D) 2

31. Which of the following is **not** true?

A) $div\,(\phi f) = \phi\nabla.f + \nabla\phi.f$

B) $curl\,(\phi f) = \phi\nabla \times f + \nabla\phi \times f$

C) $curl\,curl\,f = grad\,div\,f + \nabla^2 f$

D) $div\,curl\,f = 0$

32. The divergence of $\phi\,(x, y, z) = x^2yz\vec{i} - 2xy\vec{j} + 4z^2\vec{k}$ at (1, -1, 1) is:

A) 0 B) 2 C) -4 D) 4

33. The particular solution of the initial value problem $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = 0$, given that $y = 1$ and $\frac{dy}{dx} = 2$ at $x = 0$ is:

A) $y = xe^{2x}$ B) $y = e^{2x}$ C) $y = 4e^{2x}$ D) $y = (1 + x)e^{2x}$

34. The general solution of $x^2\frac{d^2y}{dx^2} - 4x\frac{dy}{dx} + 4y = 0$ is:

A) $y = (A + Bx)logx$ B) $y = Ax+Bx^4$

C) $y = Ax+Bx^{-4}$ D) $y = Ae^x + Be^{4x}$

35. The particular solution of $\frac{d^2y}{dx^2} - 9\frac{dy}{dx} + 8y = 7e^x$ is:

A) $y = xe^x$ B) $y = 7xe^x$ C) $y = 9xe^x$ D) $y = -xe^x$

36. Which of the following initial value problem does **not** possess unique solution?

A) $\frac{dy}{dx} = y^2 + y^3$, given $y(0) = 1$

B) $\frac{dy}{dx} = \frac{x}{y^2-4}$, given $y(2) = 0$

C) $\frac{dy}{dx} = x\,siny$, given $y(0) = 0$

D) $\frac{dy}{dx} = \frac{y}{x-1} + 2x$, given $y(1) = 1$

37. When $f(x) = |\cos x|$ is expanded as a fourier series of the form $a_0 + \sum_{n=1}^{\infty}[a_n \cos nx + b_n \sin nx]$ in the interval $(-\pi, \pi)$, the value of a_0 is:

A) $\frac{\pi}{4}$ B) $\frac{2}{\pi}$ C) $\frac{4}{\pi}$ D) 0

38. The Laplace transform of $t \sin 2t$ is:

A) $\frac{4s}{(s^2+4)^2}$ B) $\frac{s}{(s^2+4)^2}$ C) $\frac{4}{(s^2+4)^2}$ D) $\frac{4s}{(s^2+4)}$

39. The inverse Laplace transform of $\frac{s^2+3s+6}{s^3}$ is:

A) $1+t+t^3$ B) $1+3t+t^2$ C) $1+t+t^2$ D) $1+3t+t^3$

40. Which of the following property does **not** hold for Fourier Transforms?

A) If $F(s)$ and $G(s)$ are Fourier transforms of $f(x)$ and $g(x)$ respectively and a, b are constants, then $F\big(af(x)+bg(x)\big) = aF(s)+bG(s)$.

B) If $F(s)$ denote the complex Fourier transform of $f(x)$, then

$$F\big(af(x)\big) = \frac{1}{a}F\left(\frac{s}{a}\right), a \neq 0.$$

C) If $F(s)$ denote the complex Fourier transform of $f(x)$, then

$$F\big(f(x-a)\big) = e^{isa}F(s).$$

D) If $F(s)$ denote the complex Fourier transform of $f(x)$, then

$$F(f(x)\cos ax) = F(s+a) + F(s-a).$$

41. According to the third law of motion, action and reaction:

A) Always act on the same body but in opposite directions
B) Always act on different bodies in opposite directions
C) Have same magnitudes and directions
D) Act on either body at normal to each other

42. Parallelogram Law of Forces states, "if two forces acting simultaneously on a particle be represented in magnitude and direction by two adjacent sides of a parallelogram, their resultant may be represented in magnitude and direction by

A) its longer side
B) its shorter side
C) the diagonal of the parallelogram which does not pass through the point of intersection of the forces
D) the diagonal of the parallelogram which passes through the point of intersection of the force

43. When a body is subjected to two forces, the body will be in equilibrium if the two forces are:

A) Collinear, equal and act in the same direction
B) Collinear, unequal and opposite
C) Non collinear, equal and opposite
D) Collinear, equal and opposite

44. Total moment of various forces acting on the body is:
A) The vector sum of all moments
B) The algebraic sum of all moments
C) Always zero
D) The vector sum of all moments which is perpendicular to each other forces

45. It is difficult to move a cycle with brakes on because:
A) Rolling friction is more than sliding friction
B) Sliding friction is more than rolling friction
C) Sliding friction opposes motion on road
D) Rolling friction opposes motion on road

46. A block of mass 0.1 kg is held against a wall applying a horizontal force of 5N on the block. If the coefficient of friction between the block and the wall is 0.5, the magnitude of the frictional force acting on the block is:
A) 0.98 N B) 0.49 N C) 2.5 N D) 4.9 N

47. Two blocks P and Q are released at the top of a rough inclined plane so that P slides along the plane and Q falls down freely. Which will have higher velocity on reaching the ground?
A) P
B) Q
C) Both will reach the ground with same velocity
D) It depends on the coefficient of friction

48. A body of mass m hits normally a rigid wall with velocity v and bounces back with the same velocity. The impulse experienced by the body is:
A) Zero B) mv C) 1.5 mv D) 2 mv

49. All points on a rigid body rotating about a fixed axis have same:
A) Linear acceleration B) Angular velocity
C) Linear velocity D) Angular momentum

50. At the instantaneous centre of rotation, the velocity of the moving lamina at any instant is:
A) Zero B) Maximum C) Minimum D) Varying

51. How does the total energy of an oscillator executing simple harmonic vary?
A) Maximum at the mean position
B) Maximum at the extreme position
C) Maximum at a point where potential energy is equal to kinetic energy
D) It is same everywhere

52. Which of the following characteristics must remain constant for undamped oscillations of the particle?
A) Amplitude B) Phase C) Velocity D) Acceleration

53. When the body vibrates under the influence of external force, then the body is said to be under:

A) Free vibrations B) Natural vibrations
C) Forced vibrations D) Damped vibrations

54. Quality factor of a damped oscillator is:

A) Directly proportional to damping co-efficient
B) Inversely proportional to damping co-efficient
C) Inversely proportional to amplitude of oscillation
D) Directly proportional to amplitude of oscillation

55. In case of forced oscillations, the resonance peak becomes very sharp when the

A) Amplification is small B) Damping force is small
C) Restoring force is small D) None of these

56. The equation of a progressive wave is $y = 4 \sin (200t - x)$ where y and x are in metres and t in seconds. The amplitude of the wave is:

A) 1 m B) 2 m C) 4 m D) 8 m

57. Light from two coherent sources of same amplitude and wavelength illuminates the screen. The intensity of the central maximum is I. If the sources were incoherent the intensity at the same point will be:

A) I/2 B) I C) 2I D) 4I

58. For observing interference in a thin film with a light of wavelength λ, the thickness of the film:

A) May be of any magnitude B) Should be much smaller than λ
C) Should be of the order of λ D) Should be a few thousand times λ

59. In a certain region of a thin film, we get 6 fringes with light of wavelength 500 nm. How many fringes will we get in the same region with light of wavelength 600 nm?

A) 6 B) 5 C) 30 D) 36

60. Which property of light is confirmed by diffraction?

A) Wave nature B) Transverse wave nature
C) Longitudinal wave nature D) Quantum nature

61. The de Broglie wavelength of electron and proton are the same. Which quantity will be same for both?

A) Kinetic energy B) Accelerating potential
C) Velocity D) Momentum

62. If uncertainty in the position of an electron is zero, the uncertainty in its momentum will be:

A) $< h/4\pi$ B) $> h/4\pi$ C) zero D) Infinite

63. A material with two of the three dimensions in nano range and the third dimension is large is known as:
A) Micro material B) Quantum wire
C) Quantum dot D) Macro material

64. A sound is said to be of rich quality when it contains:
A) A note of high frequency B) Only the fundamental frequency
C) A note of high amplitude D) Many harmonics

65. In a good auditorium, the reverberation time is:
A) Zero
B) Infinite
C) Determined by the type of the auditorium
D) Determined by the number of persons present at any instant

66. Which of the following is **not** a property of good acoustic materials?
A) They have a low coefficient of absorption
B) They are comparatively cheap
C) They are durable
D) They are efficient over a wide frequency range

67. When an alternating voltage is applied on a pair of opposite faces of piezoelectric crystal (quartz), it starts vibrating at the frequency of the applied voltage. This is called:
A) Piezoelectric effect B) Inverse Piezoelectric effect
C) Magnetostriction effect D) None of these

68. Which of the following is **not** a property of LASER?
A) Directionality B) Polychromatic
C) Coherence D) High intensity

69. In an optical fiber, the refractive index of the cladding material should be:
A) Less than that of the core B) More than that of the core
C) Very low D) Nearly unity

70. In holography:
A) Only phase of a wave reflected from the object is recorded on the film
B) Only amplitude of a wave reflected from the object is recorded on the film
C) Amplitude as well as phase of a wave reflected from the object is recorded on the film
D) Neither amplitude nor phase of a wave reflected from the object is recorded on the film

71. The number of signal peaks observed for the hydrogens of neopentane in its NMR spectra will be:
A) 1 B) 2 C) 3 D) 4

72. Assertion (A): During galvanisation a coating of Zn is done over iron.
Reason (R) : Zn has a higher negative electrode potential value than iron

A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true but R is not the correct explanation of A
C) A is true but R is false
D) A is false but R is true

73. Identify the **wrong** statement among the following:
A) Electrochemical corrosion occurs when two dissimilar metals are present in an electrolytic medium
B) When equilibrium is attained inside the two half-cells of the electrochemical cells, the net voltage across the electrodes become zero
C) Dichrometry is an example for redox titration
D) A photovoltaic cell is an electrochemical cell

74. Which among the following is an advantage of electroless plating?
A) High durability compared.
B) Electroless plating does not require a conductive surface
C) Uniform coating can be obtained.
D) All the above

75. Given below are the half-cell reactions of an imaginary electrochemical cell. Emf of this cell will be:

$Y^{2+} \rightarrow Y^{3+} + e^-$ $\quad E°_{X+/X} = -0.71$ V

$X^+ + e^- \rightarrow X$ $\quad E°_{X+/X} = -0.40$ V

A) + 1.02 V B) + 0.31 V C) – 1.02 V D) – 0.31 V

76. Second overtone in IR spectroscopy refers to a transition from:
A) v =0 to v =1 B) v =0 to v =2 C) v =0 to v =3 D) v =0 to v =4

77. Given below are two reactions involving ferrous and ferric oxidation states.
Reaction I: $Fe^{2+}(aq) + 2e^- \rightarrow Fe(s)$
Reaction II: $Fe^{3+}(aq) + e^- \rightarrow Fe^{2+}(aq)$
Reaction III: $Fe^{3+}(aq) + 3e^- \rightarrow Fe(s)$
If the E° values of Reaction I and II are – 0.4512 and 0.7806 V respectively, the free energy change for Reaction III will be:

A) 54.2 kJ B) 31.8 kJ C) 11.8 kJ D) 1.63 kJ

78. A shift in λ_{max} to higher wavelengths is known as:
A) bathochromic shift B) hypsochromic shift
C) hyperchromic shift D) hypochromic shift

79. The number of normal modes of vibration of H_2O molecule and CO_2 molecule are respectively:
A) 3 & 3 B) 4 & 4 C) 3 & 4 D) 4& 3

80. In ^{1}H-NMR spectra, the aryl protons are observed in the range -----ppm.
A) 1 to 3.5 B) 6.5 to 8 C) 9 to 10 D) > 10

81. DTG is a plot of temperature in the x-axis and ----- in the y-axis.
A) ΔT B) $\Delta H/dt$ C) dm/dT D) mass

82. Identify the **wrong** statement:
A) The stationary phase is a solid and the mobile phase is a liquid in paper chromatography
B) The stationary phase in Thin Layer Chromatography is a solid.
C) The mobile phase in column chromatography is a liquid.
D) Both the stationary and the mobile phases in paper chromatography are liquids

83. Which among the following is **not** a top-down approach in nano material synthesis?
A) Laser ablation B) Electron beam lithography
C) Mechanical ball billing D) Sol gel method

84. The isomerism existing between Diethylamine and Methyl propylamine is:
A) Chain B) Position C) Metamerism D) Tautomerism

85. The IUPAC name of $CH_3CH_2COCH_2CH_2COOH$ is:
A) 3-oxohexanoicacid B) 4-oxohexanoicacid
C) 3-formylhexanoicacid D) 3-acetylpropanoicacid

86. The **incorrect** statement among the following is:
A) Residual hardness after Zeolite process is less than that after a Lime soda process
B) Zeolite process can be effectively used to treat acidic water
C) Water treated with zeolite process contains larger amount of sodium salts than in raw water.
D) Zeolite process is also known as permutit process

87. The energies of the conformers of cyclohexane follows the order:
A) Chair > Twist-boat > Boat > Half-chair
B) Half-chair > Boat > Twist-boat > Chair
C) Boat > Twist-boat > Half-chair > Chair
D) Twist-boat > Boat > Half-chair > Chair

88. Identify the correct relation regarding the units of hardness of water:
A) 1 ppm = 1 mg/L B) 1 ppm = 10 mg/L
C) 10 ppm = 1 mg/L D) 1 ppm = 10^6 mg/L

89. Chlorination is a preferred method for disinfection of water. Which among the following will affect the efficiency of the process?
A) Temperature B) Time of contact
C) pH D) All the above

90. Which of the following is **not** a thermosetting polymer?
A) Epoxy Resin
B) Bakelite
C) Urea-Formaldehyde Resin
D) Nylon 66

91. What is the correct syntax to declare a variable in C?
A) int a; B) var int a; C) int a: D) int a = 10;

92. Which of the following is a valid C variable name?
A) int B) 123variable C) variable_1 D) variable-1

93. What is the output of the following code?

```
int a = 5, b = 10;
printf("%d", a + b);
```

A) 5 B) 10 C) 15 D) None of these

94. Which of the following operators is used to get the address of a variable in C?
A) * B) & C) @ D) #

95. What is the output of the following code?

```
#include <stdio.h>
int main() {
    printf("%d", 5+10*3);
    return 0;
}
```

A) 45 B) 35 C) 15 D) 30

96. What is the size of an *int* data type in C?
A) 2 Bytes B) 4 Bytes
C) 8 Bytes D) It depends on the compiler

97. What is the output of the following code?

```
#include <stdio.h>
  int main() {
  int x = 10, y = 5;
  printf("%d", x | y);
 return 0;
}
```

A) 2 B) 5 C) 10 D) 15

98. Which of the following is used to input a string in C?
A) gets() B) scanf() C) printf() D) putchar()

99. What will be the output of the following code?

```
#include <stdio.h>
int main() {
    int a = 10;
    if (a < 20) {
      printf("a is less than 20\n");
    }
 return 0;
}
```

A) No output
B) a is less than 20
C) Error
D) None of these

100. Which of the following is **not** a valid storage class in C?
A) auto B) static C) register D) private

101. Which of the following functions is used to compare two strings in C?
A) strcmp() B) strcpy() C) strcat() D) strlen()

102. Which of the following statements about functions is true in C?
A) A function can have more than one return statement
B) A function cannot return a value
C) A function cannot call another function
D) Functions can only return integer values

103. Which of the following is the correct syntax to declare a constant in C?
A) const int a;
B) int const a;
C) Both A and B
D) None of these

104. What is the output of the following code?

```
#include <stdio.h>
int main() {
   int var = 10;
   int *ptr;
   ptr = &var;
   printf("%d", *ptr);
   return 0;
}
```

A) Address of var
B) 10
C) Value of ptr
D) Error

105. What will be the output of the following code?

```
#include <stdio.h>
int main() {
    int x = 5;
    int *ptr = &x;
   *ptr = 10;
   printf("%d", x);
   return 0;
}
```

A) 5 B) 10 C) Address of x D) Garbage value

Questions **106-112**. Read the passage and choose the most appropriate answer from the options provided.

Seeing cars with no human inside move through the streets is eerie enough as a pedestrian, but when I'm on my bicycle I often find myself riding alongside them, and from that vantage point you catch the ghostly spectacle of a steering wheel turning without a hand. Since August, driverless cars have been available as taxis hailed through apps but I more often see empty cars than ones with backseat passengers. These robots in the shape of cars don't move like those with human drivers. While I waited next to one at a busy intersection, the vehicle first halted at the yellow light, then rolled into the intersection, where it stopped when the light turned red, confounding the traffic around it.

106. A pedestrian travels -------.
A) on a bicycle B) by airplane C) on foot D) in a bus or train

107. The word 'eerie' means:
A) Unseemly B) Uncanny C) Incredible D) Incredulous

108. 'Spectacle' refers to:
A) Eyeglasses B) Looking glasses
C) Visual display D) Virtual despair

109. The steering wheel of driverless cars is ------ to turn without a hand.
A) impended B) pretended
C) programmed D) pre-programmed

110. The passage mentions that driverless cars are:
A) Apps B) Inhuman C) Unmoving D) Robots

111. An 'intersection' might also be called a/an:
A) Interjection B) Intervention C) Juncture D) Junction

112. To 'confound' means to:
A) Discover B) Disfigure C) Prevent D) Perplex

Questions **113 -116**. Fill in the blanks, using the correct options:

113. It is I who --------- wrong, not you.
A) am B) are C) is D) isn't

114. -------is a wonderful way of keeping fit.
A) Swim B) To swim C) Swimming D) Having to swim

115. Married couples need to feel -------a future together.
A) they will build B) they shall build
C) they are building D) they can be building

116. The treasure was discovered by Gopal, -------?
A) is it B) isn't it C) wasn't it D) hadn't it

Questions **117-120**. Answer the following, choosing the most appropriate of the options given:

117. Pick the correctly spelt word:
A) fulfil B) fullfil C) fullfill D) fullfell

118. Point out the part of the sentence below that contains an error, or choose 'D' to indicate there is no error in it:

He is A | almost like a father B | to me. C | D (No error)

119. 'To beat around the bush' is to:
A) Avoid speaking about an important but unpleasant topic
B) Sweepa garden free of dried leaves and litter
C) To reveal secret information
D) To be unnecessarily harsh or unkind

120. A saying or remark which has been made very often and is therefore not at all original or interesting is a:
A) Maxim B) Proverb C) Cliché D) Riddle
