164/2025

Question Booklet Alpha Code: **A**

Question Booklet Serial Number:

Total No. of questions : 100 Time : 1 Hour 30 Minutes

Maximum : 100 Marks

INSTRUCTIONS TO CANDIDATES

1. The question paper will be given in the form of a Question Booklet. There will be four versions of question booklets with question booklet alpha code viz. A, B, C & D.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the question booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a question booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your question booklet is un-numbered, please get it replaced by new question booklet with same alpha code.
6. The question booklet will be sealed at the middle of the right margin. Candidate should not open the question booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the question booklet supplied to him contains all the 100 questions in serial order. The question booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the question booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball-Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

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Maximum : 100 marks

Time : 1 hour and 30 minutes

1. The effect of rise in temperature is :

(A) To increase the resistance of electrolytes

(B) To decrease the resistance of pure metals

(C) Both (A) and (B)

(D) None of the above

2. The main characteristics of a series circuit :

(A) Voltage drops are additive

(B) Powers are additive

(C) Both (A) and (B)

(D) None of the above

3. A circuit has two parallel resistors : 30 Ω and 150 Ω. The current through the 30 Ω resistor is 10 A. Find the resistance of a third resistor to be added in parallel so that the total current becomes 18 A.

(A) 50 Ω

(B) 150 Ω

(C) 60 Ω

(D) 30 Ω

4. At a node, two unknown currents meet along with a known current of 7 A entering. If the two leaving currents are 2 A and 5 A respectively, what is the net current entering or leaving the node?

(A) 0 A (balanced)

(B) 9 A enters

(C) 12 A leaves

(D) 14 A enters

5. A 1.5 kW heater operates for 4 hours daily. How many units of electricity does it consume in 30 days?

(A) 180 kWh

(B) 150 kWh

(C) 120 kWh

(D) 140 kWh

6. The product of electric field intensity at any point within a dielectric medium and the absolute permittivity at the same point is called :

(A) Electric Potential

(B) Electric Displacement

(C) Electric Potential Gradient

(D) Electric Flux

7. Which of the following is correct?

(A) The voltage across a capacitor is proportional to current

(B) Current in the capacitor is present only when voltage on it changes with time

(C) Capacitor voltage can change instantaneously

(D) All of the above

8. The SI unit of magnetic permeance is :

(A) Weber-ampere

(B) Ampere-turns

(C) Henry

(D) Weber per meter

9. A coil of resistance 100 Ω and 200 turns is placed in a magnetic field of 2 mWb. A galvanometer of resistance 200 Ω is connected in series with the coil. If the coil is moved in 0.2 seconds from the given field to a field of 0.5 mWb, calculate the average induced e.m.f. and the current.

(A) 5 V and 2.5 mA

(B) 2.5 V and 1.5 mA

(C) 2.5 V and 2.5 mA

(D) 1.5 V and 5 mA

10. Two coils have self-inductances of 100 mH and 150 mH. When connected in series aiding, the total inductance is 250 mH. What is the coefficient of coupling between the coils?

(A) 10

(B) 0

(C) 1

(D) Infinity

11. The resistivity of a semiconductor _____ with increase in temperature.

(A) Increases

(B) Decreases

(C) Remains same

(D) Becomes zero

12. The process of adding impurities to a pure semiconductor to increase its conductivity is called :

(A) Polarization (B) Saturation

(C) Oxidation (D) Doping

13. Zener diode works in which region?

(A) Forward bias region (B) Reverse breakdown region

(C) Cut-off region (D) No biasing

14. The efficiency of a half-wave rectifier is approximately :

(A) 40.6% (B) 20.2%

(C) 81.2% (D) 100%

15. The voltage gain of a common-emitter amplifier is :

(A) High (B) Low

(C) Unity (D) Zero

16. Thermal runaway is due to :

(A) Decrease in supply voltage

(B) Decrease in collector current

(C) Increase in base resistance

(D) Increase in leakage current with temperature

17. The gate-to-source voltage that makes the drain current zero is called :

(A) Forward voltage (B) Pinch-off voltage

(C) Breakdown voltage (D) Reverse voltage

18. The MOSFET is controlled by :

(A) Current (B) Voltage

(C) Power (D) Resistance

19. A 7909 voltage regulator provides an output of :

(A) +5 V (B) +9 V

(C) –9 V (D) +12

20. The device that can control power in one direction only is :

(A) DIAC (B) TRIAC

(C) SCR (D) MOSFET

21. In an AC circuit containing resistance and inductance, the power factor is given by :

(A) R/Z (B) Z/X_L

(C) X_L/Z (D) Z/R

22. If frequency of supply is doubled, the reactance of a pure capacitor will :

(A) Double (B) Remain unchanged

(C) Become half (D) Become zero

23. In star connection, each phase has a voltage of 230 V. Then calculate the line voltage.

(A) 236.31 V (B) 398.36 V

(C) 461.48 V (D) 690.12 V

24. Calculate the RMS value of a sinusoidal current with a peak value of 10 A.

(A) 5 A (B) 7.07 A

(C) 8.5 A (D) 10 A

25. Which of the following is the first step in providing first aid for an electric shock victim?

(A) Start CPR immediately

(B) Touch and move the victim to safety

(C) Switch off the power source

(D) Pour water on the victim

26. The form factor of an alternating current waveform is the ratio of :

(A) Average value to RMS value

(B) RMS value to average value

(C) Peak value to RMS value

(D) RMS value to peak value

27. The watt-hour efficiency of a lead-acid cell is generally :

(A) Equal to ampere-hour efficiency

(B) Always 100%

(C) Greater than ampere-hour efficiency

(D) Lower than ampere-hour efficiency

28. What is the colour code for an earth wire in electrical installations?

(A) Red (B) Black

(C) Green (D) Blue

29. The primary purpose of earthing in electrical installations is to :

(A) Reduce power losses

(B) Provide a low-resistance path for fault currents

(C) Increase system voltage

(D) Improve power factor

30. Calculate the total number of cells required in a solar PV system with 48V DC and 300 Ah. Each battery cell is 2 V, 150 Ah :

(A) 24 (B) 36

(C) 48 (D) 60

31. Which IC can be used a Voltage Controlled Oscillator (VCO)?

(A) IC 741 (B) IC 555

(C) LM 566 (D) IC 7805

32. In a practical differentiator, a small resistor is often added in series with the input capacitor to :

(A) Increase the gain

(B) Prevent oscillation and reduce high-frequency noise

(C) Decrease the output impedance

(D) Provide a DC path for the input bias current

33. In a Colpitt's oscillator, the feedback is derived from a :

(A) Tapped inductor (B) Capacitive voltage divider

(C) Resistive voltage divider (D) Tuned transformer

34. Which ADC type is generally the fastest?

(A) Dual Slope
(B) Successive Approximation
(C) Counter Type
(D) Flash

35. In a successive approximation type ADC, the conversion time for an n-bit converter is :

(A) Proportional to 2^n
(B) Proportional to n
(C) Constant and independent of n
(D) Proportional to the input voltage

36. In a differential amplifier, a high CMRR is desirable because it means the amplifier :

(A) Has a very high voltage gain
(B) Can reject noise common to both inputs effectively
(C) Has a very wide bandwidth
(D) Consumes very little power

37. The primary function of a Schmitt Trigger is to :

(A) Amplify signals
(B) Generate sine waves
(C) Convert a noisy signal into a clean square wave
(D) Integrate a signal

38. The input bias current of an op-amp is defined as the :

(A) Difference between the two input base currents
(B) Average of the two input base currents
(C) Maximum current that can be sourced from the input
(D) Current required to zero the output offset voltage

39. The primary function of the three op-amp configuration in an instrumentation amplifier is to provide :

(A) High output current
(B) High input impedance and high CMRR
(C) Low output impedance
(D) Oscillation

40. The purpose of a precision rectifier over a standard diode rectifier is to :

(A) Handle higher voltages

(B) Rectify very high-frequency signals

(C) Eliminate the diode forward voltage drop error

(D) Provide electrical isolation

41. Which of the following statement/s is/are true regarding PVC conduit wiring?

(i) Conduit size is stated in terms of inner diameter.

(ii) It provides protection against mechanical damage.

(A) Both (i) and (ii) are true

(B) Only (i) is true

(C) Only (ii) is true

(D) Both (i) and (ii) are false

42. What is the approximate nominal cross sectional area of a multistranded wire with following specifications 3/0.925?

(A) 2

(B) 3

(C) 3.5

(D) 2.5

43. Which of the following statement/s is/are true regarding HRC fuse?

(i) It requires replacement after each operation.

(ii) Interlocking is possible in these types of fuses.

(A) Both (i) and (ii) are true

(B) Only (i) is true

(C) Only (ii) is true

(D) Both (i) and (ii) are false

44. Which of the following statement/s is/are true regarding plate earthing?

(i) The advantage of plate earthing is that the discontinuity of earth wire with plate can be observed physically.

(ii) Earthing plate is surrounded by alternate layers of salt and charcoal to reduce earth resistance.

(A) Both (i) and (ii) are true

(B) Only (i) is true

(C) Only (ii) is true

(D) Both (i) and (ii) are false

45. Which of the following statement/s is/are true regarding MCB?

(i) MCBs are connected in series with phase wire.

(ii) The thermal overload protection in a MCB is achieved with a solenoid operating a plunger.

(A) Both (i) and (ii) are false

(B) Only (i) is true

(C) Only (ii) is true

(D) Both (i) and (ii) are true

46. Which of the following statement/s is/are true regarding full wave diode rectifier with centre tapped transformer?

(i) Peak inverse voltage of diode used is less compared to that of diode used in half wave rectifier.

(ii) The output voltage has more ripple content compared to half wave rectifier.

(A) Both (i) and (ii) are true

(B) Only (i) is true

(C) Only (ii) is true

(D) Both (i) and (ii) are false

47. Which of the following statement/s is/are true regarding UJT relaxation oscillator employing an RC circuit?

(i) The discharge time of the capacitor is made larger compared to the charging time.

(ii) The width of the output pulse can be varied by varying the resistance or capacitance.

(A) Both (i) and (ii) are true

(B) Only (ii) is true

(C) Only (i) is true

(D) Both (i) and (ii) are false

48. Which of the following statement/s is/are true regarding IGBT?

(i) It has a lower conduction drop like a power transistor.

(ii) It has a high input impedance like power MOSFET.

(A) Both (i) and (ii) are true

(B) Only (ii) is true

(C) Only (i) is true

(D) Both (i) and (ii) are false

49. Which of the following statement/s is/are true regarding TRIAC?

(i) It is a bidirectional thyristor.

(ii) It has three terminals.

(iii) It is used widely for control of power in AC circuits.

(A) Only (i) and (ii) are true

(B) Only (ii) is true

(C) Only (ii) and (iii) are true

(D) (i), (ii) and (iii) are true

50. Match the following components of a UPS to their functions :

(1)	Battery charger	(i)	Converts AC to DC
(2)	Inverter	(ii)	Converts DC to AC
(3)	Static contactor	(iii)	Connects load from inverter to alternate AC supply

(A) (1)-(ii), (2)-(i), (3)-(iii)

(B) (1)-(iii), (2)-(ii), (3)-(i)

(C) (1)-(i), (2)-(ii), (3)-(iii)

(D) (1)-(i), (2)-(iii), (3)-(ii)

51. The Gray code equivalent of binary 101 is :

(A) 101

(B) 111

(C) 110

(D) 100

52. How many distinct values can be represented using an 8-bit binary number?

(A) 128

(B) 255

(C) 256

(D) 512

53. The binary value 1 represents which logic level?

(A) High

(B) Low

(C) Negative

(D) Undefined

54. The Boolean expression $A + \overline{A}B$ simplifies to :

(A) A

(B) B

(C) $A + B$

(D) AB

55. How many flip-flops are required to design a 4-bit counter?

(A) 1 (B) 2

(C) 3 (D) 4

56. What is the size of the program counter in 8051?

(A) 8-bit (B) 64-bit

(C) 16-bit (D) 32-bit

57. Which logic family is most suitable for implementing complex digital systems like microprocessors?

(A) SSI (B) MSI

(C) LSI (D) VLSI

58. The fan-out of a TTL gate is usually :

(A) 10 (B) 5

(C) 1 (D) 15

59. Which logic family generally has the lowest static power dissipation?

(A) TTL (B) CMOS

(C) ECL (D) DTL

60. Which memory has the fastest access time?

(A) DRAM (B) SRAM

(C) EEPROM (D) ROM

61. The armature core of a DC Machine is made of _____ material.

(A) Carbon (B) Silicon Steel

(C) Iron (D) Steel

62. The number of parallel paths in a Wave Wound 8 pole DC Generator?

(A) 2 (B) 8

(C) 8/2 (D) 8×2

63. The material used for the commutator :

(A) Iron (B) Aluminum

(C) Silicon Steel (D) Copper

64. The front pitch of a 4 pole 24 slots Single Layer Lap Winding of a DC Generator is :

(A) 8 (B) 6

(C) 7 (D) None

65. In a Lap Winding, the number of brushes are equal to :

(A) 2 (B) Poles

(C) 4 (D) Commutator Segments

66. The generating voltage at the generating station in Kerala is :

(A) 11 KV (B) 400 V

(C) 230 V (D) 440 V

67. An AC Induction Motor has :

(A) Commutator (B) Brushes

(C) Slip (D) None of these

68. What is the frequency of AC supply in most house hold electrical system in India?

(A) 40 Hz (B) 50 KHz

(C) 50 Hz (D) 70 KHz

69. Why do Single-Phase Induction Motors require an auxiliary winding?

(A) To increase motor weight

(B) To decrease motor heating

(C) To reduce flux density

(D) To create a rotating magnetic field and provide starting torque

70. The motor which can be used in both AC and DC supply is generally known as?

(A) Universal Motor (B) Repulsion Motor

(C) Synchronous Motor (D) Induction Motor

71. In a TV receiver, the color killer :

(A) cuts off the chroma stages during monochrome reception

(B) ensures that no color is transmitted to monochrome receivers

(C) prevents color overloading

(D) makes, sure that the color burst is not mistaken for sync pulses, by cutting off reception during the back porch

72. In radio broadcasting, rhombic antennas are used for :

(A) short distance broadcasting

(B) long distance directional broadcasting

(C) uniform coverage around an antenna

(D) none of above

73. The value of a resistor creating thermal noise is doubled. The noise power generated is therefore :

(A) halved (B) quadrupled

(C) doubled (D) unchanged

74. Bandwidth occupied by 100 MHZ carrier, AM modulated by signal frequency of 10 KHZ is :

(A) 100 MHZ (B) 20 KHZ

(C) 10 KHZ (D) 110 MHZ

75. The positive peak of an AM wave is 16V and the minimum value is 4V. Assuming single tone modulation, the modulation index is :

(A) 0.6 (B) 0.25

(C) 4 (D) 0.36

76. In a television camera tube, scanning of a picture is done :

(A) Line by line from left to right

(B) Line by line from right to left

(C) Line by line from top to bottom

(D) Line by line from bottom to top

77. The decoder for PAL system is :

(A) Similar to NTSC decoder

(B) Similar to NTSC decoder supplemented by 64 ms delay line

(C) Similar to NTSC decoder supplemented by 64 ms delay line and an electronic commutator

(D) Either (B) or (C)

78. Which one of the following is non-resonant antenna?

(A) Folded dipole
(B) Broad side array
(C) End fire array
(D) Rhombic antenna

79. In PCM, the quantization noise depends on :

(A) Sampling rate
(B) Signal power
(C) No. of quantization level
(D) Signal energy

80. The modulation technique most affected by noise is :

(A) ASK
(B) PSK
(C) FSK
(D) QAM

81. Consider the following statements :

(i) Moving iron power factor meters are commonly used rather than electrodynamic type of meters.

(ii) Moving iron power factor meters are more prone to errors compared to electrodynamic type of meters.

Which of the statement is/are CORRECT?

(A) Only (i)
(B) Only (ii)
(C) Both (i) and (ii)
(D) Neither (i) and (ii)

82. When the current through the operating coil in a moving iron instrument gets doubled, the initial operating torque :

(A) Remain same
(B) Increases four times
(C) Decreases four times
(D) Increases two times

83. Consider the statements in three phase power measurement using two wattmeter method :

(i) The power factor is unity when both wattmeters has identical readings.

(ii) The power factor is unity when one of the wattmeters reads zero.

(iii) The power factor is 0 when both wattmeters read same and one wattmeter gives a negative reading ($W_1 = -W_2$)

Identify the Correct statements :

(A) Only (i)
(B) Only (ii) and (iii)
(C) Only (i) and (ii)
(D) Only (i) and (iii)

84. In an electro dynamo meter wattmeter, the pressure coil is :

(A) Highly inductive
(B) Purely inductive
(C) Highly resistive
(D) Purely resistive

85. Which of the following statement/s is/are True about a current transformer?

(i) The primary winding has few turns.
(ii) The secondary winding has few turns.
(iii) The primary winding has large number of turns.
(iv) The secondary winding has large number of turns.

(A) Only (i) and (ii)
(B) Only (i) and (iv)
(C) Only (ii) and (iii)
(D) Only (iii)

86. In an energy meter copper shading bands are provided to :

(A) Bring flux exactly in quadrature with applied voltage
(B) Increase the speed of the aluminium disc
(C) Balance the system from vibration
(D) Reduce creeping error

87. A multimeter is used for the measurement of which of the following :

(i) ac voltage and current
(ii) dc voltage and current
(iii) energy
(iv) power

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

88. Which of the following method is used for the measurement of Medium Resistance?

(A) Kelvins Double bridge
(B) Wheatstone's bridge
(C) Direct-Deflection method
(D) Anderson's bridge

89. The bridge that is used to measure the inductance of a coil is :

(A) Schering bridge
(B) Kelvins Bridge
(C) Wein's bridge
(D) Maxwell's Bridge

90. Arrange the following components in a data acquisition system :

(1) Amplifier
(2) Analog to Digital converter
(3) Filter
(4) Sensors and Transducers
(5) Display

(A) (4)-(1)-(3)-(2)-(5)
(B) (4)-(3)-(1)-(2)-(5)
(C) (4)-(2)-(3)-(1)-(5)
(D) (4)-(2)-(1)-(3)-(5)

91. How much on-chip RAM is available in 8051 microcontroller?

(A) 64 bytes
(B) 128 bytes
(C) 2 Kbytes
(D) 4 Kbytes

92. Which special function register of 8051 microcontroller is used to hold the memory address during a data transfer from external memory?

(A) A Register
(B) B Register
(C) PC
(D) DPTR

93. The initial value in the SP register of 8051 microcontroller after a system reset :

(A) 00H
(B) 7FH
(C) 07H
(D) FFH

94. Which port pins of 8051 microcontroller have no alternate functions?

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

95. Which bit in the PSW register of 8051 microcontroller functions as the AC flag?

(A) PSW.0 (B) PSW.2

(C) PSW.6 (D) PSW.7

96. Which range of addresses in the 8051 microcontroller's internal RAM is dedicated to bit-addressable memory?

(A) 00H to 1FH (B) 80H to FFH

(C) 30H to 7FH (D) 20H to 2FH

97. Which control signal of 8051 microcontroller is used to read a program code byte from an external EPROM memory?

(A) $\overline{RD}$ (B) $\overline{WR}$

(C) *ALE* (D) $\overline{PSEN}$

98. Which of the following instructions written for 8051 microcontroller uses direct addressing mode for data transfer?

(A) MOV A, 30h (B) MOV A, #30h

(C) MOV A, R0 (D) MOV A, @R0

99. Which part of the following special function register of 8051 microcontroller has control bits and flags for the external interrupts?

(A) Lower nibble of TMOD

(B) Upper nibble of TMOD

(C) Lower nibble of TCON

(D) Upper nibble of TCON

100. If the crystal frequency of 8051 microcontroller is 12 MHz, what will be the timer clock frequency?

(A) 1MHz (B) 3MHz

(C) 6MHz (D) 12MHz

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