Seat No.

Total No. of Pages : 21

P.G. Entrance Examination 2025
M.Sc. Electronics
Subject Code : 58298

Day and Date : Tuesday, 13-May-2025 **Total Marks : 100**
Time : 01.00 pm to 02.30 pm

Instructions:

1) All questions are compulsory.
2) Each question carries 1 mark.
3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
4) Follow the instructions given on OMR sheet.
5) Rough work shall be done on the sheet provided at the end of question paper.

1. Which of the following is an example of a passive electronic component?

   A) Transistor

   B) Integrated Circuit (IC)

   C) Resistor

   D) Diode

2. The primary function of a transformer is to:

   A) Convert AC to DC.

   B) Conven DC to AC

   C) Step up or step down AC voltage.

   D) Amplify electrical power.

3. Kirchhoff's Current Law (KCL) states that:

   A) The sum of voltages around any closed loop in a circuit is zero.

   B) The total voltage in a parallel circuit is the same across each component

   C) The algebraic sum of currents entering and leaving a node (junction) in an electrical circuit is zero,

   D) The current through a resistor is directly proportional to the voltage across it and inversely propertional to its resistance.

4. When a PN junction diode is forward biased:

   A) The depletion region widens.

   B) The barrier potential increases.

   C) The majority carriers are pushed towards the junction

   D) The current flow is significantly reduced.

5. The output of a half-wave rectifier contains:

   A) Only the positive half-cycles of the input AC signal.

   B) By Only the negative half-cycles of the input AC signal.

   C) Both positive and negative half-cycles of the input AC signal.

   D) A steady DC voltage..

6. The binary equivalent of the decimal number 10 is

   A) 1010

   B) 1100

   C) 0101

   D) 1001

7. The output of an AND gate is HIGH only when:

   A) Any of its inputs is HIGH.

   B) All of its inputs are HIGH.

   C) Any of its inputs is LOW

   D) All of its inputs are LOW.

8. Which of the following logic gates are considered universal gates!

   A) AND and OR B) OR and NOT

   C) AND and NOT D) NAND and NOR

9. A half adder has:

   A) One input and two outputs (Sum. Carry)

   B) Two inputs (A. B) and one output (Sum).

   C) Two inputs (A. B) and two outputs (Sum, Carry).

   D) Three inputs (A, B, Carry-in) and two outputs (Sum, Carry-out).

10. A 3-to-8 decoder has:

    A) 3 input lines and 3 output lines.

    B) 3 input lines and 8 output lines,

    C) 8 input lines and 3 output lines.

    D) 8 input lines and 8 output lines.

11. A Bipolar Junction Transistor (BJT) is a ..... controlled device.

    A) Voltage B) Current

    C) Resistance D) Power

12. Which region of operation is a BJT primarily used for amplification?

    A) Cut-off region. B) Saturation region.

    C) Active region D) Breakdown region

13. Cascading amplifiers means connecting:

    A) The output of one amplifier to us own input (feedback).

    B) The output of one amplifier to the input of the next amplifier in a series.

    C) The inputs of multiple amplifiers together.

    D) The power supplies of multiple amplifiers together.

14. The Barkhausen criteria for sustained oscillations in a feedback amplifier states that the loop gain (All) must be equal to:

    A) 0 B) -1

    C) 1 D) Infinity

15. An oscillator is an electronic circuit that produces:

    A) A constant DC voltage.

    B) A constant DC current.

    C) An amplified version of the input signal.

    D) A periodic AC waveform without an external imput signal.

16. Which flip-flop is characterized by a race-around condition when both J and K inputs are highly?

    a) SR Flip-Flop

    b) D Flip-Flop

    c) JK Flip-Flop

    d) T Flip-Flop

17. What is the primary function of a master-slave JK flip-flop?

    a) To increase the clock frequency

    b) To eliminate the race-around condition

    c) To store multiple bits

    d) To reduce power consumption

18. In a 4-bit Serial-in-Parallel-out shift register, how many clock pulses are required to fully load the register?

    a)1 b) 2

    c) 4 d) 8

19. Which type of counter uses a circular shift register to cycle through a fixed sequence of states"

    a) Decade Counter b) Ring Counter

    c) Asynchronous Counter d) Synchronous Counter

20. What is the modulus of a 4-bit decade counter?

    a) 4 b) 8

    c) 10 d) 16

21. .....is the noise temperature of the sun?

    A. 100000 B. 8000

    C. 100 D. 3000

22. ..... is equivalent to Henry.

    A. Volts/Ampere B. Weber Ampere

    C. Weber/Ampere D. None of these

23. In Octal system..... numbers is used.

A. 8 B. 9

C. 16 D. None of these

24. one of the following semiconductor material?

A. copper B. silicon

C. iron D. None of these

25. PAC stands for.....

A. Permanent angle converter

B. Phase angle converter

C. Phase angle components

D. Phase angle capacitor

26. Which type of memory is used to store the program that does not change frequently?

A) RAM B) ROM

C) Cache D) Register

27. If a microprocessor has 16 address lines, what is the maximum memory it can address!

A) 16 KB B) 32 KB

C) 64 KB D) 128 KB

28. The address bus of 8085 microprocessor is of ..... bits

A) 8 B) 16

C) 32 D) 64

29. How much internal ROM memory is available in standard 8051?

A) 128 bytes B) 4 KB

C) 8 KB D) 64 KB

30. The stack pointer (SP) is a special-purpose register in the 8085 that:

a) Stores the address of the next instruction to be executed.

b) Holds the data being transferred to or from memory.

c) Contains the status flags of the ALU operations.

d) Points to the top of the stack memory.

31. Sampling theorem states that the sampling rate must be at least:

A) Equal to signal frequency

B) Twice the highest frequency of the signal

C) Half the signal frequency

D) Four times the signal frequency

32. Quantization in PCM is the process of

A) Taking continuous samples

B) Converting analog values to a finite number of levels

C) Encoding data using Huffiman codes

D) Modulating the amplitude

33. What is the purpose of cell splitting in mobile networks?

A) To increase coverage

B) To decrease the number of users

C) To increase the capacity by creating smaller cells

D) To combine signals

34. Which frequency band is commonly used for GSM mobile communication?

A) 400 MHz

B) 900 MHz and 1800 MHz

C) 100 MHz

D) 5 Gliz

35. The first step in the Pulse Code Modulation (PCM) process is:

a) Quantization b) Encoding

c) Sampling d) Modulation

36. Which of the following is an example of Indirect Addressing in 8051?

A) MOV A, #5

B) MOV A@RO

C) MOV A, 30H

D) MOV DPTR, 40H

37. Winch 8051 instruction performs a logical AND operation between the contents of the accumulator and a register"

A) AND A, R0 B) ORL A, R0

C) XRL A, R0 D) ANL A, R0

38. In mode 2 of 8051 tuners, the timer register is:

A) 8-bit B) 16-bit

C) 13-bit D) 32-bit

39. Auto reload mode is allowed in which mode of the timer?

a) Mode 0 b) Mode 1

c) Mode 2 d) Mode 3

40. For writing commands on an LCD, RS bit is

    a) set b) reset

    c) set & reset d) none of the mentioned

41. Which of the following sensor types uses strain gauges for measurememt?

    A) Pressure sensor B) Temperature sensor

    C) Light sensor D) Proximity sensor

42. RTD (Resistance Temperature Detector) sensors change their. ..... with temperature,

    A) Capacitance B) Resistance

    C) Voltage D) Frequency

43. When the core of an LVDT is exactly at the center (null position), the output voltage is

    A) Maximum B) Minimum

    C) Zero D) Negative maximum

44. In a strain gauge, strain is measured as a change in:

    A) Capacitance B) Resistance

    C) Voltage directly D) Frequency

45. Active filters use which components apart from passive elements?

    A) Transformers

    B) Operational Amplifiers (Op-Amps)

    C) Inductors only

    D) Diodes only

46. Frequency synthesizers based on PLL are used for

A) Power saving

B) Generating a range of frequencies from a single reference

C) Reducing weight of circuits

D) Hear management

47. Optical encoders are used for measuring:

a) Temperature

b) Pressure

c) Linear or angular position and velocity

d) Light intensity

48. IR sensors detect electromagnetic radiation in the

a) Ultraviolet spectrum b) Visible light spectrum

c) Infrared spectrum d) Radio wave spectrum

49. The principle of operation of LVDT is based on the variation of

a) Self inductance b) Mutual inductance

c) Reluctance d) Permanence

50. Op-Amp as current to voltage converter is also called as.....

A trans-mpedance amplifier

B. trans-conductance amplifier

C. inverting amplifier

D. all of the above

51. What are the features of instrumentation amplifier?

a) Low noise

b) High gain accuracy

c) Low thermal and time drift

d) All of the mentioned

52. The knowledge of which parameter is sufficient for deriving the ume varying electromagnetic field?

a. Electric field intensity

b. Magnetic field intensity

c. Current density

d. Power density

53. Under which conditions of charge does the radiation occur through wire antenna?

a. For a charge with no motion

b. For a charge moving with uniform velocity with straight & infinite wire

c. For a charge oscillating in time motion

d. All of the above

54. In a non-isotropic directional antenna, which radiating lobe axis makes an angle of 180^0 w.r.t. major beam of an antenna?

a. Minor lobe

b. Side lobe

c. Back lobe

d. None of the above

55. At winch angles does the front to back ratio specify an antenna gain?

a. 0° & 180°

b. 90° & 180°

c. 180° & 270°

d. 180° & 360°

56. If an observation point is closely located to the source, then the field is termed as .....

a. Induced b. Radiated

c. Reflected d. Far-field

57. How many interrupt sources does the standard 8051 uucrocontroller have?

a) 2 b) 3

c) 4 d) 5

58. .....register is used to enable or disable individual interrupt sources in the 8051

a) TCON

b) TMOD

c) IE

d) IP

59. ..... is the priority order of the 8051 interrupts after a reset (from highest to lowest)

a) INT0, IF0, INT1, TE1, RI/TI

b) RI/TI, TF1, INT1, TF0, INT0

c) INT0, TF1, INT1, IT0, RI/TI

d) RI/TI, TF0. INT1, TF1, INT0

60. Port .....of the 8051 microcontroller serves as multiplexed data and address bus.

a) 0 b) 1

c) 2 d) 3

61. ..... standard is commonly used for serial communication between the 8051 and a personal computer

a) SPI b) I^2C

c) RS-232 d) Parallel port

62. The relay is interfaced with an 8051 microcontroller, ...

a) To measure analog signals.

b) To provide electrical isolation and switch high-power circuits,

c) To store digital data.

d) To display alphanumeric characters.

63. The start condition on an PC bus is signaled by.....

a) A rising edge of SDA while SCL is low.

b) A falling edge of SIDA while SCL. is high.

c) A rising edge of SC1. while SDA is low.

d) A falling edge of SCL while SDA is high.

64. .....are used for transmuting and receiving data m SPI bus

a) One bidirectional data line (SDA)

b) Two unidirectional data lines (MOSI and MISO)

c) Two Indirectional data lines (SDI and SDO)

d) One unidirectional data line (SDO)

65. What is the primary role of the drift layer in a power diode?

a) to increase forward voltage drop

b) To enhance conductivity modulation

c) To reduce reverse recovery time

d) To block high voltages

66. Which phenomenon in power diodes reduces power loss during forward conduction?

    a) Reverse recovery effect

    b) Conductivity modulation

    c) Avalanche breakdown

    d) Zener effect

67. What is the main purpose of a base drive circuit in a power transistor?

    a) To control reverse recovery

    b) To provide sufficient base current for switching

    c) To limit collector-emitter voltage

    d) To reduce drift layer resistance

68. Which characteristic makes power MOSFETs suitable for high-frequency switching?

    a) High input impedance

    b) Low on-state resistance

    c) Fast switching speed

    d) All of the above

69. What is a key structural difference between an IGBT and a power MOSFET!

    a) IGBT has a gate oxide layer, MOSFET does not

    b) IGBT has a p substrate layer. MOSFET does not

    c) MOSFET has a collector terminal, IGBT does not

    d) IGBT lacks a drift layer

70. Which device is best suited for high-voltage, high-current applications"

a) Power transistor b) Power MOSFET

c) IGBT d) Thyristor

71. In a thyristor, what triggers the turn-on process"

a) High dv/dt b) Gate current pulse

c) Reverse voltage d) High di dr

72. What is the main function of didt rating in a thyristor?

a) To limit voltage spikes

b) To prevent thermal runaway

c) To protect against rapid current rise

d) To ensure proper gate triggering

73. Which device is used to visually display waveforms in real-time?

a) VDU b) CRO

c) LCD d) Printer

74. What is the primary advantage of an ICD display over an LED display?

a) Higher power consumption b) Lower power consumption.

c) Brighter output d) Limited viewing angle

75. What is the function of a spectrum analyzer?

a) Measures pH levels.

b) Analyzes frequency components of a signal

c) Records bioelectric potentials

d) Generates waveforms

76. Which component is central to a function generator using the 8038 IC?

a) Voltage-controlled oscillator b) Microprocessor

c) Digital-to-analog converter d) Spectrum analyzer

77. What is the primary purpose of instrument calibration?

a) To increase power consumption

b) To ensure measurement accuracy

c) To reduce display brightness.

d) To amplify signals

78. Which mechanical component is used to convert rotational motion to translational motion?

a) Gear train b) Cam

c) Ratchet and pawl d) Belt drive

79. What is an advantage of a brushless permanent magnet DC motor?

a) Requires frequent maintenance

b) Higher efficiency and longer lifespan

c) Lower torque output

d) Complex control system

80. Which power electronic device is used for voltage regulation and reactive power compensation in power syslctas

a) Diode b) MOSFET

c) IGBT d) SVC

81. Multimode step index fiber has .....

a) Large core diameter & large numerical aperture

b) Large core diameter and small mumerical aperture

c) Small core diameter and large numerical aperture

d) Small core diameter & small numerical aperture

82. A typically structured glass multimode step index fiber shows as variation of attenuation in range of .....

a) 1.2 to 90 dB km^{-1} at wavelength 0.69μm

b) 3.2 to 30 dB km^{-1} at wavelength 0.59μm

c) 2.6 to 50 dB km^{-1} at wavelength 0.85μm

d) 1.6 to 60 dB km^{-1} at wavelength 0.90μm

83. Multimode step index fiber has a large core diameter of range is .....

a) 100 to 300 μm

b) 100 to 300 nm

c) 200 to 500 μm

d) 200 to 500 nm

84. Multimode graded index fibers are manufactured from materials with .....

a) Lower purity

b) Higher purity than multimode step index fibers.

c) No impurity

d) Impurity as same as multimode step index fibers.

85. The performance characteristues of multimode graded index fibers are

a) Better than multimode step index fibers

b) by Sane as multimode step index fibers

c) Lesser than multimode step index fibers

d) Negligible

86. Multimode graded index fibers with wavelength of 0.85μm have numerical aperture of 0.29 have core/cladding diameter of.....

a) 62.5 μm/125 μm b) 100 μm/140 μm

c) 85 μm/125 μm d) 50 μm/ 125μm

87. .....PIC microcontroller family is generally considered the entry-level series with limited peripherals and memory.

a) PIC18 b) PIC24

c) Baselme (PIC10, PIC12, PIC16) d) dsPIC

88. ..... feature found in many PIC microcontroller families that allows for in-circuit reprogramming.

a) USART b) SPI

c) ICSP d) ADC

89. The Harvard architecture in PIC microcontrollers allows for .....

a) Simultaneous fetching of instructions and data.

b) A single address bus for both program and data memory.

c) More complex instruction set.

d) Easier amemory management.

90. The W Register in the PIC microcontroller.

a) stores the program counter value.

b) holds the status flags (carry, zero, etc.).

c) serves as the primary accumulator for arithmetic and logic operations

d) manages the interrupt priority levels.

91. .....is true about stack of PIC microcontroller

    a) Software-managed stack in data memory,

    b) Hardware stack with a fixed depth.

    c) Combination of hardware and software stack.

    d) Stack is not used in PIC microcontrollers.

92. The Power-Up Tuner in the PIC18 microcontroller is used

    a) To measure the duration of a power failure.

    b) To provide a delay after power is applied before the microcontroller starts executing code

    c) To generate a periodic interrupt for power management.

    d) To monitor the battery voltage level.

93. PIC18 microcontrollers feature ..... serial communication interfaces.

    a) I-C (Inter-Integrated Circuit)

    b) SPI (Serial Peripheral Interface)

    c) USART (Universal Synchronous Asynchronous Receiver Transmitter)

    d) All of the above

94. An open-loop control system is characterized by

    a) Output being dependent on the input.

    b) Output laving no effect on the control action.

    c) The presence of feedback.

    d) Increased stability.

95. The component that directly acts on the controlled variable to achieve the desired output is the .....

(a) Sensor (b) Controller

(c) Actuator. (d) Feedback element.

96. Negative feedback in a control system generally .....

(a) Increases the system gain..

(b) Improves stability and reduces errors.

(c) Makes the system more sensitive to parameter variations.

(d) Slows down the system response.

97. A Programmable Logic Controller (PLC) is primarily used for .....

(a) High speed data processing..

(b) Controlling automated industrial processes,

(c) Complex mathematical calculations.

(d) Internet communication in industrial settings.

98. .....is a programming language that is widely used for PLC programming.

(a) C++ (b) Assembly

(c) Ladder Logic. (d) Python.

99. Contacts connected in series on a Ladder Logic rung represent a logical:

(a) OR operation. (b) AND operation,

(c) NOT operation (d) XOR operation.

100. In Ladder Logic, the power nails are typically represented by .....

(a) Horizontal lines. (b) Vertical lines.

(c) Diagonal lines. (d) Circular lines.

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ROUGH WORK