Seat No.	

Ph.D. Entrance Examination 2025
ELECTRONICS
Subject Code: 58799

Day and Date : Tuesday, 09-Sep-2025　　　　　　　**Total Marks : 100**
Time : 10.00 am to 12.00 noon

Instructions:

1) All questions are compulsory.
2) Each question carries 2 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. What is the primary purpose of conducting a literature review in research?

   A) To summarize the researcher's personal opinions

   B) To provide background information and context for the study

   C) To showcase the researcher's writing skills

   D) To demonstrate statistical techniques

2. Which of the following is NOT a characteristic of qualitative research?

   A) Focuses on exploring attitudes, behaviours, and experiences

   B) Emphasizes numerical data analysis

   C) Utilizes methods like interviews, observations, and case studies

   D) Seeks to understand meanings and interpretations

3.   What does the term "sample size" refer to in research?

A) The number of research questions addressed

B) The range of values in the dataset

C) The number of participants or observations included in the study

D) The number of pages in the research report

4.   Which of the following is an example of a quantitative research tool?

A) Focus groups   B) Ethnography

C) Surveys   D) Case studies

5.   What is the purpose of using statistical software in research?

A) To create visual aids for presentations

B) To analyses qualitative data

C) To perform complex data analysis and calculations

D) To transcribe interview recordings

6.   Which research technique involves observing and recording behaviors in their natural setting without interference?

A) Case study   B) Experimental study

C) Survey research   D) Observational study

7.   The role of a project supervisor is to:

a) give you a reading list.

b) provide academic support, guidance and critical feedback on your work.

c) negotiate access to the research setting on the student's behalf.

d) ensure you keep to your schedule and deadlines.

8   Statement 1: A is bigger than B but shorter than C

Statement 2: D is smaller than C and bigger than A

Statement 3: B is greater than D

If statement 1 and statement 2 are true, statement 3 will be-

a. true   b. false

c. uncertain   d. None of the above

9.   The day before yesterday was Saturday. What will be the day after tomorrow?

a. Thursday   b. Friday

c. Wednesday   d. Monday

10. Which of the following set of letters complete the letter series, when sequentially placed at the gaps?

_ab_b_aba_abab

a. abbab   b. abbaa

c. abaab   d. asaba

11. Statement 1: John runs faster than George

Statement 2: Tom runs faster than John

Statement 3: George runs faster than Tom

If statement 1 and statement 2 are true, statement 3 will be -

a. true   b. false

c. uncertain   d. None of the above

12. What will be the missing number in the series 196, 169, 144, ...100, 81?

    a. 121   b. 120

    c. 119   d. 118

13. The upper and lower limits of measurement made by an instrument specify its ....

    a) accuracy   b) resolution

    c) precision   d) range

14. Sensors convert signals from physical to .... domain.

    a) Electrical   b) Mechanical

    c) Both a and b   d) None of these

15. .... refers to the techniques related to the study in product design and manufacturing processes that try to understand how variability or imperfections in components propagate across the design.

    a) Tolerance Analysis

    b) Variability Analysis

    c) Error Analysis

    d) Defect Analysis

16. The power in electric circuits is expressed in terms of ....

    a) Amperes   b) Volts

    c) Watts   d) Joules

17. Battery charging a capacitor to voltage V, Find energy stored in capacitor.

    a) $\frac{1}{2}CV^2$ b) CV^2

    c) $\frac{1}{2}Cl^2$ d) Cl^2

18. A prototyping model starts with .... analysis.

    a) Data   b) Requirement

    c) Dummy system   d) None of the above

19. In MATLAB, multiple graphs can be plotted using

    A) hold function   B) mplot funtion

    C) mstem funtion   D) Cannot be done in MATLAB

20. .... is an open source framework for storing data and running application on clusters of commodity hardware

    A) Cloud   B) HDFC

    C) MapReduce   D) Hadoop

21. SaaS is

    A) Storage-as-a-Service   B) Server-as-a-Service

    C) Software-as-a-Service   D) System-as-a-Service

22. In MATLAB, what is the default increment value in a for-loop?

    A) 0   B) 1

    C) 2   D) 3

23. SPICE stands for

    A) Simulation Program with Integrated Circuit Emphasis

    B) Software Program with Integrated Circuit Emphasis

    C) Simulation Program with International Circuit Emphasis

    D) Software Program with International Circuit Emphasis

24   The process of transforming a design entry information of the circuit into a set of logic equations in any EDA tool is known as

A) Simulation   B) Synthesis

C) Optimization   D) Verification

25.   Which of the following HDLs are IEEE standards?

A) VHDL and Verilog

B) C and C++

C) Altera and Xilinx

D) Quartus II and MaxPlus II

26   The device acquires information from the real world is called as ....

(a) accelerometer   (b) actuator

(c) sensor   (d) transducer

27   .... devices may be used for extending the range of the instruments?

A) shunts   B) multiplier

C) current transformers   D) all of the above

28   For any mode of propagation in a rectangular waveguide, propagation occurs:

a) Above the cut off frequency

b) Below the cut off frequency

c) Only at the cut-off frequency

d) Depends on the dimension of the waveguide

29 In TE mode of wave propagation in a rectangular waveguide, what is the equation that has to be satisfied?

a) $(\partial^2/\partial x^2 + \partial^2/\partial y^2 + kC^2).\bar{H}Z(x, y) = 0$

b) $(\partial^2/\partial x^2 + \partial^2/\partial y^2 - kC^2).HZ(x, y) = 0$

c) $(\partial^2/\partial x^2 - \partial^2/\partial y^2 + kC^2).HZ(x, y) = 0$

d) None of the mentioned

30 Very high degree of pipelining, results in ....

a. more parallel execution.

b. higher performance

c. faster execution

d. more complex design

31 Instruction size of .... architecture is larger than the others.

a. RISC

b. CISC

c. VLIW

d. Von Neumann.

32 What is the purpose of a Finite State Machine (FSM) in digital design?

A) To implement complex arithmetic operations

B) To store and manipulate data in registers

C) To model sequential logic and control systems

D) To generate random numbers for testing

33. Which of the following is NOT a characteristic of FPGA (Field-Programmable Gate Array) devices?

A) Reconfigurability

B) High-speed performance

C) Lower power consumption compared to ASICS

D) Fixed logic configuration

34   In ASK, transmission bandwidth is equal to

A) Base bandwidth

B) Half the Base bandwidth

C) Twice Base bandwidth

D) Four times Base bandwidth

35   The demodulator in delta modulation technique is

A) Differentiator   B) Integrator

C) Quantizer   D) Sampler

36   The cutoff frequency for the dominant mode in TM mode propagation for a rectangular waveguide of dimension of 30mm*40mm is:

a) 2 GFIz   b) 1 GHz

c) 2 MHz   d) 4 MHz

37   In TE10 mode of wave propagation in a rectangular waveguide, if the broader dimension of the waveguide is 40 cm, then the cutoff wavelength for that mode is:

a) 8 cm   b) 6 cm

c) 4 cm   d) 2 cm

38.   What is the advantage of using thyristors in inverters compared to other semiconductor devices?

A) Higher efficiency

B) Lower cost

C) Better thermal performance

D) Ability to handle high voltages and currents

39 In a thyristorized inverter, what role does the control circuitry play?

A) It monitors the output power

B) It adjusts the frequency of the output waveform

C) It triggers the thyristors to switch on and off

D) It regulates the input voltage from the DC source

40 Compositional and structural differences between photonic and electronic devices ....

a) Provide high efficiency   b) Provide low efficiency

c) Highly used   d) Create problems

41 To avoid large chip .... devices are used.

a) InGaAsP   b) InGa

c) GaAs   d) InGaAs

42 The time taken for response to reach 50% of final value is called as ....

A) rise time   B) delay time

C) peak time   D) settling time

43 If a Nyquist path enclose the (-1, j0) point then the system becomes..............

A) stable but oscillatory

B) stable and well damped

C) unstable

D) marginally unstable

44 If all devices are connected to a central hub, then topology is called

a) Bus Topology   b) Ring Topology

c) Star Topology   d) Tree Topology

45   Router operates in which layer of OSI Reference Model?

    a. Layer 1 (Physical Layer)   b. Layer 3 (Network Layer)

    c. Layer 4 (Transport Layer)   d. Layer 7 (Application Layer)

46   Which timer's possess an ability to prevent an endless loop hanging condition of PIC along with its own on-chip RC oscillator by contributing to its reliable operation?

    a. Power-Up Timer (PWRT)   b. Oscillator Start-Up Timer (OST)

    c. Watchdog Timer (WDT)   d. All of the above

47   How many clock pulses are confined by each machine cycle of Peripheral-Interface Controllers?

    a. 4   b. 8

    c. 12   d. 16

48   $x(t)=2\cos5000\pi t+\sin3000\pi t$ then the Nyquist rate for this signal is ....

    A) 3 KHz   B) 6 KHz

    C) 5 KHz   D) 10 KHz

49   If the output voltage of regulator varies from 15 V to 14.7 V between minimum and maximum load current the % load regulation is ....

    a. 0%   b. 1%

    c. 2%   d. 5%

50.   .... uses up processor cycles when no other activity is present, keeps CPU in known state.

    a) startup task   b) logging task

    c) debug agent task   d) idle task

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-- ROUGH WORK --