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PD - 35

Total No. of Pages : 12

Ph.d Entrance Examination March - April, 2026
ELECTRONICS
Subject Code: 58799

Day and Date : Wednesday, 07-10-2026

Total Marks : 100

Time : 10.00 a.m. to 12.00 p.m.

Instructions :

- 1) All questions are compulsory.
 - 2) Each question carries 2 marks.
 - 3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
 - 4) Use black ball point pen only for marking the circle. Do not make any stray mark on the OMR answer sheet.
 - 5) Follow the instructions given on OMR Sheet.
 - 6) Rough work shall be done on the sheet provided at the end of question paper.
 - 7) Only non-programmable calculators are allowed.
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1. What is the primary aim of research?
 - a) To prove existing theories
 - b) To generate new knowledge
 - c) To publish papers only
 - d) To follow instructions
2. Which of the following is NOT a type of research?
 - a) Basic research
 - b) Novel research
 - c) Applied research
 - d) Hypothetical research
3. Mention the tool LEAST effective for searching a research topic
 - a) Books
 - b) Journals
 - c) Internet
 - d) Random guessing

4. What is a research hypothesis?
 - a) A proven fact
 - b) An educated guess to be tested
 - c) A conclusion
 - d) A summary of research findings

5. What is the correct sequence in research design?
 - a) Data collection → Hypothesis → Analysis
 - b) Hypothesis → Data collection → Analysis
 - c) Analysis → Hypothesis → Data collection
 - d) Hypothesis → Conclusion → Data collection

6. Which quality is essential in a research work?
 - a) Curiosity
 - b) Laziness
 - c) Arrogance
 - d) Impatience

7. Convert 0.75 into a fraction:
 - A) $\frac{1}{4}$
 - B) $\frac{1}{2}$
 - C) $\frac{3}{4}$
 - D) $\frac{7}{5}$

8. A literature review primarily helps a researcher to:
 - a) Avoid collecting data
 - b) Identify existing knowledge and research gaps
 - c) Guarantee a positive result
 - d) Replace the research methodology

9. The primary purpose of an intelligence test is to measure:
- a) Memory power
 - b) Problem-solving ability
 - c) Emotional control
 - d) Physical stamina
10. The null hypothesis generally states that:
- a) There is a significant relationship between variables
 - b) There is no significant difference or relationship
 - c) The research will be successful
 - d) The sample is biased.
11. What is the primary purpose of citing sources in research?
- a) To make the bibliography longer.
 - b) To show the researcher has read many books.
 - c) To give credit to the original authors and avoid plagiarism
 - d) To add decorative elements to the research paper.
12. A sample contains 120 participants. If 30% are from Group A, how many participants belong to Group A?
- a) 24
 - b) 30
 - c) 36
 - d) 40
13. The primary objective of research is _____
- A. To collect information randomly
 - B. To summarize textbooks
 - C. To discover new knowledge or verify existing knowledge
 - D. To create big report

14. _____ research is primarily focused towards finding a solution to an immediate problem faced by society or industry.
A. Fundamental Research
B. Action Research
C. Exploratory Research
D. Applied Research
15. Which of the following is a probability sampling method?
A. Simple random sampling
B. Judgment sampling
C. Convenience sampling
D. Quota sampling
16. The primary purpose of conducting a 'pilot study' before launching the main research project is _____.
A. To pre-test data collection instruments and uncover practical operational flaws
B. To bypass the need for an extensive literature review
C. To finalize the final research report for publication
D. To completely eliminate sampling error from the study
17. _____ is considered a major limitation of collecting primary data via mailed questionnaires.
A. Interviewer bias
B. Inability to cover a geographically wide sample
C. Low response rate
D. High cost of travel for personal interviews
18. What is meant by the 'reliability' of a research instrument?
A. The instrument measures what it claims to measure
B. The instrument is free from any administrative bias
C. The instrument is economical and easy to administer
D. The instrument yields consistent and stable results across repeated trials

19. In MATLAB, which function is used to add a label to the x-axis of a plot?
- a) title()
 - b) xlabel()
 - c) axis_label()
 - d) labelx()
20. Which core numerical technique does ANSYS HFSS primarily use to solve Maxwell's equations?
- a) Finite difference time domain
 - b) Method of moments
 - c) Boundry element method
 - d) Finite element method
21. What type of network simulator is NS3?
- a) Continuous time simulator
 - b) Discrete event simulator
 - c) Trace driven simulator only
 - d) Hardware in the loop mandatory simulator
22. What is the name of Xilinx's modern, flagship design suite to synthesis and analysis of HDL designs?
- a) ISE design suite
 - b) Quartus prime
 - c) Vivado design suite
 - d) Libero SoC
23. Xilinx is known for developing:
- a) Microcontrollers
 - b) FPGAs and CPLDS
 - c) Operating systems
 - d) Analog ICs
24. What does a transient analysis calculate in Pspice?
- a) The circuit behaviour over a specified time interval
 - b) The frequency response over range of frequencies
 - c) The sensitivity of components to DC voltage shifts
 - d) The thermal noise performance of circuit

25. What is the basic use of EDA tool?
- a) Communication of Electronic devices
 - b) Fabrication of Electronic devices
 - c) Electronic circuits simulation and synthesis.
 - d) Industrial automation
26. Which architecture uses a single memory space for both instructions and data?
- A) Harvard Architecture
 - B) Von Neumann Architecture
 - C) VLIW Architecture
 - D) SIMD Architecture
27. In VLIW architecture, multiple operations are:
- A) Dynamically scheduled by hardware
 - B) Packed into a single long instruction by the compiler
 - C) Executed only one at a time
 - D) Stored exclusively in cache memory
28. An electromagnetic wave is produced by:
- A) A charge moving at a constant velocity
 - B) A stationary charge
 - C) A charge moving parallel to a magnetic field
 - D) An accelerated or oscillating charge
29. Which characteristic of an electromagnetic wave changes when it passes from one medium to another?
- A) Frequency
 - B) Wavelength
 - C) Time period
 - D) Phase

30. In a Moore machine, outputs depend on:
- a) Current state only
 - b) Current input only
 - c) Both current state and input
 - d) Neither state nor input
31. In a Mealy machine, outputs depend on:
- a) Current state only
 - b) Current input only
 - c) Both current state and input
 - d) None of the above
32. What is the phenomenon called when high frequency components of a signal take on the identity of lower frequencies due to an inadequate sampling rate?
- a) Quantification noise
 - b) Phase distortion
 - c) Leakage
 - d) Aliasing
33. What does the region of convergence look like for finite duration, two-sided discrete time signal?
- a) Interior region inside a circle
 - b) Exterior region outside a circle
 - c) Entire Z plane except $Z=0$ and $Z=\infty$
 - d) A narrow concentric ring mapping only fractional integer
34. Key characteristic of an embedded system is, _____
- A) It is designed for general-purpose computing only
 - B) It performs a specific or dedicated function
 - C) It always requires a desktop operating system
 - D) It cannot contain a microcontroller

35. Which addressing mode uses the contents of a register as the operand?
- A) Immediate addressing
 - B) Register addressing
 - C) Direct addressing
 - D) Indexed addressing
36. What a CMOS driving TTL circuits requires?
- a) High current output
 - b) High voltage output
 - c) Proper level shifting
 - d) Lower power supply
37. Where a p-MOS transistor is typically located in CMOS technology?
- a) At the bottom layer
 - b) In the n-well
 - c) Outside the chip
 - d) In the p-well
38. What is the fundamental definition of transfer function for a linear time invariant system?
- a) The ratio of the output to the input in time domain
 - b) The ratio of the Laplace transform of the output to the Laplace transform of the input under zero initial conditions.
 - c) The product of the differential equations
 - d) The steady state output divided by the peak input.
39. What is the primary physical effect of incorporating an integral action into a standard proportional controller?
- a) It drastically increases transient overshoot
 - b) It completely eliminates steady state tracking error
 - c) It improves the initial speed of the transient rise time
 - d) It acts as high pass filter

40. A hub operates primarily at which OSI layer?
- a) Physical layer
 - b) Network layer
 - c) Transport layer
 - d) Application layer
41. Which switching technique stores the entire message at an intermediate node before forwarding it?
- a) Circuit switching
 - b) Message switching
 - c) Packet switching
 - d) Frequency switching
42. Which of the following is considered a primary driver for the rapid depletion of fossil fuels in modern society?
- a) Widespread adoption of renewable solar and wind energy
 - b) Overconsumption and rapid industrialization
 - c) Increased tree plantation and afforestation drives
 - d) Strict governmental bans on global mining activities
43. Why is Carbon Dioxide (CO₂) primarily referred to as a greenhouse gas?
- a) It traps heat in the atmosphere
 - b) It creates visible blue light in the stratosphere
 - c) It cools down surface ocean currents instantly
 - d) It absorbs harmful UV rays directly
44. The main purpose of the series resistor in a Zener regulator is to:
- a) Increase load current
 - b) Limit current through the Zener diode
 - c) Increase output voltage
 - d) Eliminate ripple completely

- Rough Work -

- Rough Work -