

Seat No.

Total No. of Pages : 13

Ph.d Entrance Examination March - April, 2026
Electronics Engineering : Research Methodology
Sub. Code: 58747

Day and Date : Wednesday, 07-Oct-2026**Total Marks : 100****Time : 04.00 pm to 06.00 pm**

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.
-

- 1] Which sampling method involves selecting every nth member from a list to be included in the sample?
 - a. Stratified sampling
 - b. Systematic sampling
 - c. Convenience sampling
 - d. Snowball sampling
- 2] Which statistical test is used to determine if there is a significant difference between the means of two independent groups?
 - a. t-test
 - b. ANOVA
 - c. Pearson correlation
 - d. chi square test

- 3] What type of research design involves studying the same group of individuals over an extended period?
- a. Cross-sectional
 - b. Longitudinal
 - c. Experimental
 - d. case study
- 4] Which of the following is NOT a criterion for establishing causality in research?
- a. Temporal precedence
 - b. Covariation of cause and effect
 - c. Correlation
 - d. Absence of confounding variables
- 5] Which research approach collects and analyses numerical data?
- a. Qualitative research
 - b. Quantitative research
 - c. Action research
 - d. Case study research
- 6] Which of the following is an example of applied research?
- a. Studying the behaviour of subatomic particles
 - b. Developing a new drug for diabetes
 - c. Understanding human evolution
 - d. Theoretical physics equations

- 7] What is the main purpose of a pilot study?
- a. To prove the research hypothesis
 - b. To train research assistants
 - c. To test the feasibility of the research design.
 - d. To publish results early
- 8] In statistical analysis, the measure of central tendency includes:
- a. Mean, median, mode
 - b. Standard deviation
 - c. Variance
 - d. Correlation coefficient
- 9] Which of the following statement is correct?
- a. Reliability ensures the validity
 - b. Validity ensures reliability
 - c. Reliability and validity are independent of each other
 - d. Reliability does not depend on objectivity
- 10] Generalized conclusion on the basis of a sample is technically known as
- a. Data analysis and interpretation
 - b. Parameter inference
 - c. Statistical inference
 - d. All of the above

- 11] A null hypothesis is
- a. when there is no difference between the variables
 - b. the same as research hypothesis
 - c. subjective in nature
 - d. when there is difference between the variables
- 12] Generalised conclusion on the basis of a sample is technically known as:
- a. Data analysis and Interpretation b. Parameter inference
 - c. statistical inference d. All of the above
- 13] A statement of the quantitative research question should
- a. Extend the statement of purpose by specifying exactly the questions the researcher will address
 - b. Help the research in selecting appropriate participants, research methods, measures, and materials
 - c. Specify the variables of interest
 - d. All the above
- 14] What do you mean by an assumption?
- a. It is a framework in which research work has to be done
 - b. It simplifies the logical process of arriving at the solution
 - c. It is a restrictive condition
 - d. None of the above

- 15] The demerits of sampling methods is
- a. Existence of sampling errors
 - b. Requirements of adequately trained personnel for sample survey
 - c. Non-uniformity in sample units
 - d. All of the above
- 16) In which of the following cases, the formation of hypothesis may not be necessary?
- a. Investigative historical studies
 - b. Experimental studies
 - c. Normative studies
 - d. Survey studies
- 17] For the population with finite size which of the following sampling method is generally preferred?
- a. Cluster sampling
 - b. Area sampling
 - c. Purposive sampling
 - d. Systematic sampling
- 18] The evolution of operation research could be associated within well-known development of
- a. Industrial organization
 - b. Institutional organization
 - c. Small scale organization
 - d. Traditional organization
- 19] In which of the following selection depends on chance?
- a. Probability selection
 - b. Purposive method
 - c. Mixed sample
 - d. None of the above

- 20] A researcher uses statistical techniques in his problem to confirm
- a. Whether worthwhile inferences could be drawn
 - b. Whether the data could be quantified
 - c. Whether appropriate statistical techniques are available
 - d. Whether analysis of data would be possible
- 21] The logic of induction is very much related with
- a. The logic of sampling
 - b. The logic of controlled variable
 - c. The logic of observation
 - d. None of the above
- 22] Objective or unbiased observation is most vital in
- a. All walks of life
 - b. Performing experiments
 - c. Normal behaviour
 - d. Research methods
- 23] Which of the following methodology is being used in empirical researches?
- a. Inductive method
 - b. Deductive method
 - c. Initiative method
 - d. Scientific method

- 24] Which of the following sequences correctly represents the steps of research using a quantitative paradigm?
- a. Hypothesis framing, hypothesis testing, conclusion, and reporting
 - b. Establishing a research problem, hypothesis framing, hypothesis testing, generalization and conclusions and implications of result
 - c. Problem identification, sample selection, developing a research design and field work
 - d. Defining a problem, survey of related studies, sampling, data collection, and data analysis
- 25] Which is the research methodology predominantly used to study cultural anthropology?
- a. Interview
 - b. Panel Discussion
 - c. Participant observation
 - d. Focus group discussion

Subject Specific

- 26] In an 8085 microprocessor, the shift registers which store the result of an addition and the overflow bit are, respectively
- a. B and F
 - b. A and F
 - c. H and F
 - d. A and C
- 27] The percentage of modulation for 45 kHz deviation the FM broadcast band will be
- a. 30%
 - b. 40%
 - c. 60%
 - d. 90%

- 28] What is the probability of output generation when the inputs are '1' & '0' respectively in S-R clocked flipflop?
- a. 1,1 & output remains undefined because outputs try to become '1'
 - b. 1,0 & flip-flop is reset
 - c. 0,1 & flip-flop is set
 - d. 0,0 & output remains unchanged
- 29] Which reasons prohibit/reduce the probability of recombining of charge carriers in the base region of bi-polar junction transistor amplifier
- a. Increase in collector voltage increases the space charge width & decreases base width
 - b. Increase in emitter voltage increases the space charge width & decreases base width
 - c. Increase in emitter voltage decrease the space charge width & increases base width
 - d. Increase in collector voltage decreases the space charge width & increases base width
- 30] How can the total charge enclosed by the closed or covered surface be expressed using Gauss's law?
- a. By the line integral of the charge density
 - b. By the surface integral of the charge density
 - c. By the Volume integral of the charge density
 - d. None of the above

- 31] Which circuit converts irregularly shaped waveform to regular shaped waveforms?
- a. Schmitt trigger
 - b. Comparator
 - c. Voltage limiter
 - d. None of the mentioned
- 32] What is a key characteristic of an instrumentation amplifier?
- a. high CMRR
 - b. high output impedance
 - c. high output offset
 - d. none of the above
- 33] The gain of the first order low pass filter
- a. Increases at the rate 20dB/dec
 - b. Increases at the rate 40dB/dec
 - c. Decreases at the rate 20dB/dec
 - d. Decreases at the rate 40dB/dec
- 34] Which among the following factors affect/s the output voltage of a regulated power supply?
- a. Load current
 - b. Input voltage
 - c. Temperature
 - d. All of the above
- 35] When a transmission line has a load impedance same as that of the characteristic impedance, the line is said to be
- a. Parallel
 - b. Perpendicular
 - c. Polarized
 - d. Matched
- 36] The Gaussian surface for a point charge will be
- a. Cube
 - b. Cylinder
 - c. Sphere
 - d. Cuboid

- 37] With Gauss law as reference which of the following law can be derived?
- a. Ampere law
 - b. Faraday's law
 - c. Coulomb's law
 - d. Ohm's law
- 38] Previous probabilities in Bayes Theorem that are changed with help of new available information are classified as
- a. independent probabilities
 - b. posterior probabilities
 - c. interior probabilities
 - d. dependent probabilities
- 39] A table with all possible value of a random variable and its corresponding probabilities is called.....
- a. Probability Mass Function
 - b. Probability Density Function
 - c. Cumulative distribution function
 - d. Probability Distribution
- 40] What is the mean and variance for standard normal distribution?
- a. Mean is 0 and variance is 1
 - b. Mean is 1 and variance is 0
 - c. Mean is 0 and variance is ∞
 - d. Mean is ∞ and variance is 0
- 41] A 4 GHz carrier is DSB-SC modulated by a low-pass message signal with maximum frequency of 2 MHz. The resultant signal is to be ideally sampled. The minimum frequency of the sampling impulse train should be
- a. 4 MHz
 - b. 8 MHz
 - c. 8 GHz
 - d. 8.004 GHz

- 42) The image channel selectivity of superheterodyne receiver depends upon
- a. IF amplifiers only
 - b. RF and IF amplifiers only
 - c. Pre selector, RF and IF amplifiers
 - d. Pre selector and RF amplifiers
- 43] Quadrature multiplexing is.....
- a. the same as FDM
 - b. the same as TDM
 - c. a combination of FDM and TDM
 - d. quite different from FDM and TDM
- 44) The message bit sequence to a DPSK modulator is 1,1,0,0,1,1. The carrier phase during the reception of the first two message bits is π , π . The carrier phase for the remaining four message bits is
- a. π , π , 0, π
 - b. 0, 0, π , π
 - c. 0, π , π , π
 - d. π , π , 0, 0
- 45] A bandlimited signal is sampled at the Nyquist rate. The signal can be recovered by passing the samples through
- a. an RC filter
 - b. an envelope detector
 - c. a PLL
 - d. an ideal low-pass filter with the appropriate bandwidth

- 46] UART is similar to
- a. SPI protocol
 - b. I2C protocol
 - c. HTTP protocol
 - d. MQTT protocol
- 47] Which error occurs when UART transmitter has completed sending a character and the transmit buffer is empty?
- a. Overrun error
 - b. Underrun error
 - c. Framing error
 - d. Break condition
- 48] A binary input 000 is fed to a 3bit DAC/ADC. The resultant output is 101. Find the type of error?
- a. Settling error
 - b. Gain error
 - c. Offset error
 - d. Linearity error
- 49] Whenever a non-maskable interrupt occurs in 8085 microprocessors, which of the following data line contains the data?
- a. 2C H
 - b. 3C H
 - c. 36 H
 - d. 24 H
- 50] Which of the following is true?
- a. Every instruction has two parts i.e. opcode and operands
 - b. MOV B, C is a two-byte instruction
 - c. MVI A, 90H is a three-byte instruction
 - d. Maximum number of T-states possible for the execution of an instruction is 16



ROUGH WORK