

RESEARCH METHODOLOGY

1. What is a research hypothesis ?
 - (a) A statement of fact
 - (b) A testable prediction
 - (c) A conclusion drawn from data
 - (d) A research tool

2. Which of the following is *not* a type of research design ?
 - (a) Exploratory
 - (b) Descriptive
 - (c) Conclusive
 - (d) Narrative

3. What is the primary goal of exploratory research ?
 - (a) To gain insights and explore ideas
 - (b) To test hypotheses
 - (c) To confirm existing theories
 - (d) To collect quantitative data

4. Which of the following is a characteristic of qualitative research ?
 - (a) Seeks to understand meanings and experiences
 - (b) Focuses on numerical data
 - (c) Uses random sampling exclusively
 - (d) Involves statistical analysis

5. In research, what does 'sampling' refer to ?
- (a) Choosing a research question
 - (b) Selecting a subset of a population
 - (c) Analyzing data
 - (d) Formulating a hypothesis
6. What is the main purpose of a literature review in research ?
- (a) To gather data
 - (b) To summarize findings
 - (c) To identify gaps and justify research
 - (d) To formulate hypotheses
7. Which of the following is a potential source of error in research designs ?
- (a) Bias
 - (b) Control groups
 - (c) Random sampling
 - (d) Variable manipulation
8. What role do variables play in research ?
- (a) They are fixed elements
 - (b) They represent measurable traits or characteristics
 - (c) They are irrelevant to research
 - (d) They only exist in qualitative studies
9. Which of the following research designs focuses on establishing cause-and-effect relationships ?
- (a) Descriptive
 - (b) Exploratory
 - (c) Causal
 - (d) Historical

10. Which term describes the ethical obligation to report findings truthfully ?
- (a) Scientific misconduct (b) Research integrity
(c) Intellectual honesty (d) Conflicts of interest
11. What is the role of propositions in theory building ?
- (a) They serve as standalone theories
(b) They are relationships that can be tested
(c) They are irrelevant to research
(d) They only exist in qualitative studies
12. What distinguishes conclusive research from exploratory research ?
- (a) It uses qualitative methods
(b) It aims to provide final answers
(c) It is less structured
(d) It only involves surveys
13. Which of the following is a key principle of research ethics ?
- (a) Fabrication of data
(b) Plagiarism
(c) Informed consent
(d) Ignoring conflicts of interest
14. In which of the following is the 'impact factor' primarily used ?
- (a) Qualitative Research (b) Descriptive Research
(c) Experimental Research (d) Academic Publishing

15. Which of the following describes 'falsification' in research misconduct ?
- (a) Copying someone else's work
 - (b) Misrepresenting research data
 - (c) Making false claims about authorship
 - (d) Not citing sources
16. What is the primary focus of descriptive research ?
- (a) To find cause-and-effect relationships
 - (b) To provide a detailed account of a phenomenon
 - (c) To explore new areas of study
 - (d) To test hypotheses
17. Which research method is typically used for gathering qualitative data ?
- (a) Surveys
 - (b) Experiments
 - (c) Interviews
 - (d) Case studies
18. Which of the following is a criterion for evaluating research sources ?
- (a) Popularity
 - (b) Author's age
 - (c) Length
 - (d) Relevance
19. What does ICT stand for in the context of research ?
- (a) Information and Communication Technology
 - (b) Information Collection Techniques
 - (c) Integrated Communication Tools
 - (d) International Collaborative Teams

20. In which stage of the research process are objectives formulated ?
- (a) Data collection (b) Literature review
(c) Research design (d) Analysis
21. What is the significance of referencing in research ?
- (a) To embellish the paper
(b) To acknowledge sources and avoid plagiarism
(c) To make the paper longer
(d) To confuse readers
22. What type of error occurs when a researcher fails to control for extraneous variables ?
- (a) Systematic error (b) Random error
(c) Measurement error (d) Sampling error
23. Which type of sampling involves selecting participants based on specific characteristics ?
- (a) Random sampling (b) Convenience sampling
(c) Stratified sampling (d) Purposive sampling
24. What is the primary aim of causal research ?
- (a) To explore relationships
(b) To describe phenomena
(c) To establish a cause-effect relationship
(d) To gather qualitative data

25. Which of the following describes the term 'plagiarism' ?
- (a) Collaborating without acknowledgement
 - (b) Falsifying data
 - (c) Using someone else's work without credit
 - (d) Misrepresenting findings
26. What is one of the main objectives of conclusive research ?
- (a) To provide conclusive evidence
 - (b) To explore ideas
 - (c) To generate new theories
 - (d) To gather exploratory data
27. What type of research focuses on events that have already occurred ?
- (a) Historical
 - (b) Experimental
 - (c) Descriptive
 - (d) Exploratory
28. Which of the following best describes 'scientific misconduct' ?
- (a) Ethical research practices
 - (b) Ignoring conflicts of interest
 - (c) Any violation of ethical standards in research
 - (d) Thorough data analysis
29. What does qualitative data typically consist of ?
- (a) Numbers and statistics
 - (b) Experimental results
 - (c) Graphs and charts
 - (d) Text, interviews, and observations

30. Which of the following is an example of a secondary data source ?
- (a) A survey conducted by the researcher
 - (b) A laboratory experiment
 - (c) Interviews conducted by the researcher
 - (d) Government statistics
31. In research, what is a 'theory' ?
- (a) A guess
 - (b) A proven fact
 - (c) A systematic explanation of phenomena
 - (d) An anecdotal observation
32. Which of the following is an essential aspect of research integrity ?
- (a) Avoiding all criticism
 - (b) Ignoring dissenting opinions
 - (c) Acknowledging contributions of others
 - (d) Overstating the significance of findings
33. Which referencing style is most commonly used in social sciences ?
- (a) APA
 - (b) MLA
 - (c) Chicago
 - (d) Harvard
34. What is an impact factor ?
- (a) A measure of a journal's quality
 - (b) A tool for qualitative research
 - (c) A statistical method for data analysis
 - (d) A type of sampling technique

35. What is the rationale for using qualitative research ?
- (a) To quantify results
 - (b) To understand complex behaviors and social phenomena
 - (c) To conduct experiments
 - (d) To gather numerical data only
36. Which of the following terms refers to an error that occurs due to chance ?
- (a) Systematic error
 - (b) Sampling error
 - (c) Measurement error
 - (d) Random error
37. What is the role of indexing and citation databases in research ?
- (a) To limit access to research
 - (b) To promote unethical research
 - (c) To track and evaluate research outputs
 - (d) To confuse researchers
38. In qualitative research, what is a common method of data collection ?
- (a) Randomized controlled trials
 - (b) Surveys with closed questions
 - (c) Focus groups
 - (d) Statistical analysis
39. What does the term 'conflicts of interest' refer to in research ?
- (a) When researchers are unbiased
 - (b) When personal interests affect research integrity
 - (c) When researchers work collaboratively
 - (d) When data is misinterpreted

40. Which of the following is a key component of ethical research conduct ?
- (a) Ignoring ethical guidelines
 - (b) Transparency in data reporting
 - (c) Misrepresenting authorship
 - (d) Fabricating data
41. What is the focus of historical research ?
- (a) Present data analysis
 - (b) Future predictions
 - (c) Understanding past events
 - (d) Causal relationships
42. In research, what does 'data interpretation' involve ?
- (a) Collecting new data
 - (b) Analyzing and making sense of data
 - (c) Conducting interviews
 - (d) Writing the research proposal
43. Which of the following best describes 'data triangulation' ?
- (a) Using multiple methods or data sources to enhance credibility
 - (b) Collecting data from a single source
 - (c) Focusing solely on quantitative data
 - (d) Analyzing data without context
44. What is one of the main functions of a research design ?
- (a) To gather irrelevant data
 - (b) To outline the research approach
 - (c) To ignore ethical considerations
 - (d) To present data without analysis

45. What does it mean to 'fabricate' data in research ?
- (a) To collect data ethically
 - (b) To summarize findings accurately
 - (c) To analyze data thoroughly
 - (d) To create false data or results
46. What is a common tool used for qualitative data analysis ?
- (a) SPSS
 - (b) NVivo
 - (c) Excel
 - (d) R
47. Which of the following research methods is most suitable for studying small, specific groups ?
- (a) Surveys
 - (b) Experiments
 - (c) Case studies
 - (d) Longitudinal studies
48. What is the purpose of publication ethics ?
- (a) To ensure fair and honest reporting in research
 - (b) To promote unethical practices
 - (c) To prioritize personal gain
 - (d) To limit research collaboration
49. Which of the following represents a qualitative data analysis method ?
- (a) Correlation analysis
 - (b) ANOVA
 - (c) Regression analysis
 - (d) Thematic analysis
50. What role does ICT play in modern research ?
- (a) It complicates the research process
 - (b) It has no impact on research
 - (c) It limits access to research findings
 - (d) It facilitates data collection and analysis

ECE

51. At room temperature the current in an intrinsic semiconductor is due to :
- (a) holes (b) electrons
(c) ions (d) holes and electrons
52. In which of these is reverse recovery time nearly zero ?
- (a) Zener diode (b) Tunnel diode
(c) Schottky diode (d) PIN diode
53. A transistor has a current gain of 0.99 in the CB mode. Its current gain in the CC mode is :
- (a) 100 (b) 99
(c) 1.01 (d) 0.99
54. In an n channel JFET, the gate is :
- (a) n type (b) p type
(c) either n or p (d) partially n and partially p
55. The amount of photoelectric emission current depends on :
- (a) frequency of incident radiation
(b) intensity of incident radiation
(c) both frequency and intensity of incident radiation
(d) None of the above

56. A transistor has two $p-n$ junctions. The batteries should be connected such that :
- (a) both junctions are forward biased
 - (b) both junctions are reverse biased
 - (c) one junction is forward biased and the other is reverse biased
 - (d) None of the above
57. As compared to an ordinary semiconductor diode, a Schottky diode :
- (a) has higher reverse saturation current
 - (b) has higher reverse saturation current and higher cut in voltage
 - (c) has higher reverse saturation current and lower cut in voltage
 - (d) has lower reverse saturation current and lower cut in voltage
58. Crossover distortion behaviour is characteristic of :
- (a) class A O/P stage
 - (b) class B O/P stage
 - (c) class AB output stage
 - (d) common pulse O/P state
59. The resolution of an n bit DAC with a maximum input of 5 V is 5 mV. The value of n is :
- (a) 8
 - (b) 9
 - (c) 10
 - (d) 11
60. 2's complement of binary number 0101 is :
- (a) 1011
 - (b) 1111
 - (c) 1101
 - (d) 1110

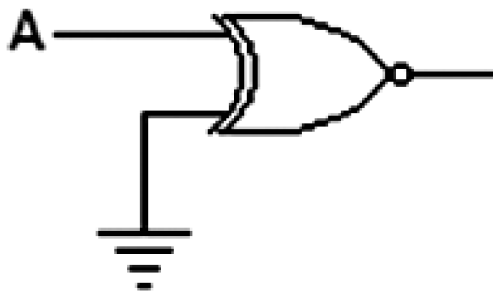
61. A decade counter skips :

- (a) binary states 1000 to 1111
- (b) binary states 0000 to 0011
- (c) binary states 1010 to 1111
- (d) binary states 1111 to higher

62. A ring counter with 5 flip-flops will have :

- (a) 5 states
- (b) 10 states
- (c) 32 states
- (d) infinite states

63. For the gate in the given figure the output will be :



- (a) 0
- (b) 1
- (c) A
- (d) \bar{A}

64. Which of the following is non-saturating ?

- (a) TTL
- (b) CMOS
- (c) ECL
- (d) Both (a) and (b)

70. What about the stability of system in $H(z) = \frac{z(3z-4)}{(z-0.4)(z-2)}$?

- (a) system is stable (b) unstable
(c) stable at 0.4 (d) can't say

71. If $I(s) = \frac{5(s+250)}{s(s+100)}$, initial value of $i(t)$ is :

- (a) 12.5 A (b) 5A
(c) 0.05 A (d) 1250 A

72. The analog signal $m(t)$ is given below $m(t) = 4 \cos 100 \pi t + 8 \sin 200 \pi t + \cos 300 \pi t$, the Nyquist sampling rate will be :

- (a) 1/100 (b) 1/200
(c) 1/300 (d) 1/600

73. The ROC of sequence in the Z.T. of sequence $x[n] = a^n \cup [n]$ is :

- (a) $z > a$ (b) $z < a$
(c) $|z| > a$ (d) $|z| < a$

74. The final value theorem is :

- (a) $\lim_{t \rightarrow \infty} f(t) = \lim_{s \rightarrow 0} [sF(s)]$
(b) $\lim_{s \rightarrow \infty} f(t) = \lim_{s \rightarrow \infty} [sF(s)]$
(c) $\lim_{t \rightarrow 0} f(t) = \lim_{s \rightarrow \infty} [F(s)/s]$
(d) $\lim_{s \rightarrow \infty} f(t) = \lim_{s \rightarrow \infty} [F(s)/s]$

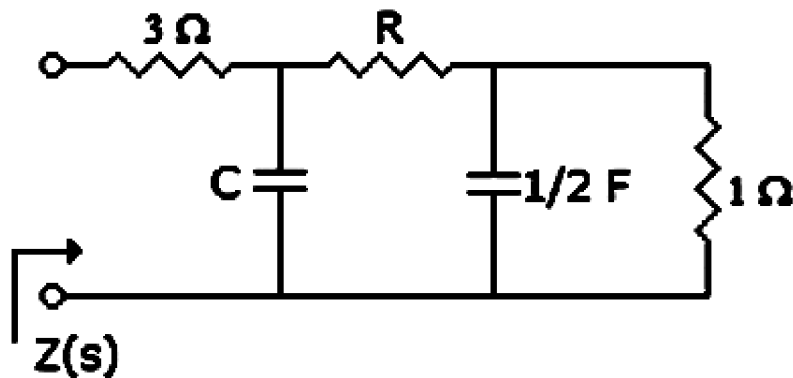
75. A cordless telephone using separate frequencies for transmission in base and portable units is known as :
- (a) duplex arrangement
 - (b) half duplex arrangement
 - (c) either (a) or (b)
 - (d) neither (a) nor (b)
76. For attenuation of high frequencies we should use :
- (a) series capacitance
 - (b) shunt capacitance
 - (c) inductance
 - (d) resistance
77. VSB modulation is preferred in TV because :
- (a) it avoids phase distortion at low frequencies
 - (b) it reduces the bandwidth requirement to half
 - (c) it results in better reception
 - (d) None of the above
78. In colour TV receiver, varactor diode is used for :
- (a) detection
 - (b) rectification
 - (c) tuning
 - (d) both (a) and (b)
79. Energy content of atmospheric noise :
- (a) does not depend on frequency
 - (b) decreases as frequency is increased
 - (c) increases as frequency is increased
 - (d) either (a) or (c) depending on the temperature

80. A 400 W carrier is amplitude modulated with $m = 0.75$. The total power in AM is :
- (a) 400 W (b) 512 W
(c) 588 W (d) 650 W
81. Which of the following cannot be the Fourier series expansion of a periodic signal ?
- (a) $x(t) = 2 \cos t + 3 \cos 3t$
(b) $x(t) = 2 \cos \pi t + 7 \cos t$
(c) $x(t) = \cos t + 0.5$
(d) $x(t) = 2 \cos 1.5 \pi t + \sin 3.5 \pi t$
82. Which of the following is the indirect way of FM generation ?
- (a) Reactance bipolar transistor modulator
(b) Armstrong modulator
(c) Varactor diode modulator
(d) Reactance FM modulator
83. As the frequency increases, the absorption of ground wave by earth's surface :
- (a) decreases (b) increases
(c) remains the same (d) either (a) or (c)

92. An RLC series circuit is underdamped. To make it overdamped, the value of R :

- (a) has to be increased
- (b) has to be decreased
- (c) has to be increased to infinity
- (d) has to be reduced to zero

93. $Z(s)$ for the network shown in the figure is $\frac{3(s^2 + 6s + 8)}{s^2 + 4s + 3}$. The value of C and R are, respectively :



- (a) $1/6\ \text{F}$ and $4\ \Omega$
- (b) $2/9\ \text{F}$ and $9/2\ \Omega$
- (c) $2/3\ \text{F}$ and $1/2\ \Omega$
- (d) $1/2\ \text{F}$ and $1\ \Omega$

97. **Assertion (A)** : Potentiometers can not be used as error detectors in position control systems.

Reason (R) : The resolution of a potentiometer places an upper limit on its accuracy

- (a) Both A and R are correct and R is correct explanation of A
- (b) Both A and R are correct but R is not correct explanation of A
- (c) A is correct but R is wrong
- (d) R is correct but A is wrong

98. A stepper motor is :

- (a) a two phase induction motor
- (b) a kind of rotating amplifier
- (c) an electromagnetic transducer used to convert an angular position of shaft into electrical signal
- (d) an electromechanical device which actuates a train of step angular movements in response to a train of input pulses on one to one basis

99. A system has its two poles on the negative real axis and one pair of poles lies on $j\omega$ axis. The system is :

- (a) stable
- (b) unstable
- (c) limitedly stable
- (d) either (a) or (c)

100. A unity feedback system has open-loop transfer function $\frac{2s+1}{s^2}$. The closed-loop transfer function is :

- (a) $\frac{s^2}{2s+1}$
- (b) $\frac{2s+1}{s^2+2s+1}$
- (c) $\frac{1}{s^2+5s+1}$
- (d) $\frac{s}{s^2+2s+1}$