RESEARCH METHODOLOGY

1. Research in common parlance refers to :

(a) Teaching students (b) A search for knowledge

(c) Writing books (d) Data entry

2. According to Redman and Mory, research is :

(a) An academic activity

(b) A systematic search for truth

(c) A systematized effort to gain new knowledge

(d) An experimental process

3. Causal research is related to :

(a) Cause and effect relationship

(b) History of events

(c) Sample size

(d) Literature review

4. Which of the following is *not* an objective of research ?

(a) To gain familiarity with a phenomenon

(b) To portray characteristics of a group

(c) To advertise a product

(d) To test a hypothesis

5. Which research is concerned with developing new theories ?

(a) Applied research (b) Descriptive research

(c) Fundamental research (d) Diagnostic research

6. Research based on numerical data and measurement is called :

(a) Qualitative research (b) Quantitative research

(c) Conceptual research (d) Historical research

7. Empirical research is based on :

(a) Pure imagination (b) Philosophy

(c) Experience and observation (d) Literature reviews

8. The first step in the research process is :

(a) Collecting data

(b) Literature survey

(c) Formulating the research problem

(d) Data analysis

9. Theory building is based on :

(a) Guesswork

(b) Concepts and propositions

(c) Rumors

(d) Opinions only

10. A hypothesis is :

(a) A proven fact

(b) A random idea

(c) A testable statement

(d) An assumption without testing

11. Research objectives show :

(a) Cost of research (b) Purpose of research

(c) Sample size (d) Referencing style

12. Exploratory research is used when :

(a) The problem is well defined

(b) Little information is available

(c) Final conclusions are needed

(d) Data is complete

13. An error in research design mainly affects :

(a) Validity of results (b) Font of report

(c) Paper quality (d) Referencing style

14. Sampling means :

(a) Studying whole population

(b) Selecting a part of population

(c) Ignoring data

(d) Collecting only opinions

15. Which is *not* a type of data ?

(a) Qualitative (b) Quantitative

(c) Conceptual (d) Numerical

16. Qualitative data is related to :

(a) Measurements (b) Numerical values

(c) Descriptions and meanings (d) Equations

17. Data sources may be :

(a) Primary and Secondary (b) Only Primary

(c) Only Secondary (d) None of these

18. Research tools includes :

(a) Questionnaire and interview (b) Calculator and ruler

(c) Only computer (d) Printer

19. Data interpretation means :

(a) Collecting data

(b) Organizing files

(c) Explaining the meaning of data

(d) Deleting data

20. Qualitative research is best suited for studying :

(a) Human behaviour (b) Electrical circuits

(c) Machine design (d) Chemical formulas

21. Research procedures involve :

(a) Planning, collecting and analyzing data

(b) Only writing a report

(c) Just reading books

(d) Random activities

22. Conceptual research mainly deals with :

(a) Theories and ideas (b) Surveys

(c) Experiments only (d) Interviews

23. APA and MLA are examples of :

(a) Research tools (b) Sampling techniques

(c) Referencing styles (d) Research designs

24. Research integrity mainly refers to :

(a) High salary in research

(b) Honesty and ethical behaviour in research

(c) Fast publication

(d) Using advanced software

25. Which of the following is a form of scientific misconduct ?

(a) Referencing properly
(b) Falsification of data
(c) Peer review
(d) Data analysis

26. Fabrication in research means :

(a) Copying text
(b) Making up data or results
(c) Editing references
(d) Rewriting theories

27. Plagiarism is defined as :

(a) Using own ideas
(b) Citing all references
(c) Using someone else's work without credit
(d) Publishing in a journal

28. FFP stands for :

(a) Fair, Free, Public
(b) Fast, Formal, Published
(c) Falsification, Fabrication, Plagiarism
(d) Final, Full, Print

29. Publication ethics deals with :

(a) Journal design

(b) Ethical rules in publishing research

(c) Author salary

(d) Website development

30. Which of the following is important in publication ethics ?

(a) Proper citation (b) Fake results

(c) Hidden data (d) Paid reviews

31. Conflict of interest occurs when :

(a) Research is published

(b) Personal interest affects professional judgement

(c) Data is verified

(d) Research is repeated

32. A citation database is mainly used to :

(a) Create documents

(b) Track research impact and citations

(c) Edit images

(d) Translate texts

33. Scopus, Web of Science and Google Scholar are examples of :

(a) Sample tools

(b) Social media apps

(c) Word processors

(d) Citation and indexing databases

34. Impact Factor is used to measure :

(a) The length of a journal

(b) The reputation and citation level of a journal

(c) The cost of publication

(d) Number of pages

35. Higher Impact Factor usually indicates :

(a) Lower-quality journal

(b) More frequently cited journal

(c) Fewer readers

(d) Fake journal

36. ICT in research is mainly used to :

(a) increase paper size

(b) improve efficiency in data collection and analysis

(c) replace researchers

(d) reduce knowledge

37. Latest updates in research mainly come through :

(a) Newspapers

(b) Social media gossip

(c) Research journals and conferences

(d) Television shows

38. Self-plagiarism means :

(a) Using other's work

(b) Reusing one's own published work without acknowledgement

(c) Taking permission

(d) Writing new content

39. Which one is an example of unethical research practice ?

(a) Informed consent (b) Peer review

(c) Data manipulation (d) Proper referencing

40. Ethical research ensures :

(a) Wrong results (b) Trustworthy and reliable findings

(c) Faster copying (d) No verification

41. The main parts of research design include all except :

(a) Sampling design (b) Observational design

(c) Statistical design (d) Writing design

42. An independent variable is one which :

(a) depends on another variable

(b) is constant

(c) causes change in another variable

(d) never changes

43. A confounded relationship occurs when :

(a) Independent variable has no effect

(b) Dependent variable is influenced by extraneous variables

(c) Sample size is small

(d) Hypothesis is rejected

44. Factorial design is mainly used to :

(a) Study only one variable

(b) Determine effects of more than one factor

(c) Write literature review

(d) Collect qualitative data

45. Errors in measurement can occur due to :

(a) Respondent only (b) Measuring instrument only

(c) Measurer only (d) All of these

46. Content validity is judged mainly by :

(a) Mathematical formula

(b) Researcher's judgement and expert opinion

(c) Computer software

(d) Sample size only

47. A reliable measuring instrument gives :

(a) Random results (b) Always wrong results

(c) Consistent results (d) Only valid results

48. Scaling is the process of :

(a) Removing data

(b) Assigning numbers to attitudes or opinions

(c) Writing a report

(d) Deleting responses

49. Likert scale is an example of :

(a) Cumulative scale (b) Summated scale

(c) Arbitrary scale (d) Differential scale

50. The error caused due to generalized impression of the rater is called :

(a) Error of leniency (b) Error of central tendency

(c) Halo effect (d) Measuring error

51. Two two-port networks are connected in cascade. The combination is to be represented by a single two-port network. The parameters of the single two-port network are obtained by multiplying the individual :

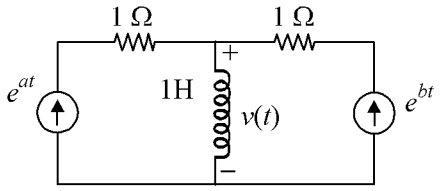
(a) Z parameter matrix

(b) h parameter matrix

(c) ABCD parameter matrix

(d) Y parameter matrix

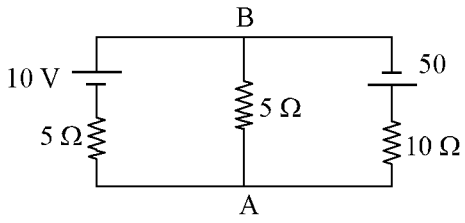
52. In the circuit shown, voltage across the inductor is given by :



(a) $e^{at} - e^{bt}$ (b) $e^{at} + e^{bt}$

(c) $ae^{at} - be^{bt}$ (d) $ae^{at} + be^{bt}$

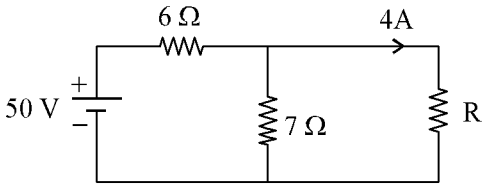
53. For the circuit shown in the figure, voltage V_{AB} is given by :



(a) 10 V (b) 6 V

(c) 25 V (d) 40 V

54. The value of resistance 'R' in the given circuit is given by :



(a) 3.5 Ω (b) 2.5 Ω

(c) 1 Ω (d) 4.5 Ω

55. The number of indepedent loops for a network with 'n' nodes and 'b' branches is :

(a) $n - 1$

(b) $b - n + 1$

(c) $b - n$

(d) independent of number of nodes

56. All poles and zeros of a driving point immitance function of an L-C network :

(a) should lie on the jw axis

(b) should lie on the +ve real axis

(c) should lie on the – ve real axis

(d) can lie anywhere in the S-plane

57. Silicon diode has cut-in voltage equal to :

(a) 0.7 V (b) 0.3 V

(c) 1.1 V (d) 0.5 V

58. In a *p* type Si-sample, the hole concentration is $2.25 \times 10^{15}/cm^3$. If the intrinsic carrier concentration is $1.5 \times 10^{10}/cm^3$, the electron concentration is :

(a) Zero (b) $10^{10}/cm^3$

(c) $1.5 \times 10^{25}/cm^3$ (d) $10^5/cm^3$

59. The static characteristics of an adequately forward biased *p-n* junction is a straight line, if the plot is of :

(a) log I *versus* log V (b) log I *versus* V

(c) I *versus* log V (d) I *versus* V

60. Avalanche breakdown diodes have breakdown voltage :

(a) having positive temperature coefficient

(b) having negative temperature coefficient

(c) independent of temperature

(d) dependent on temperature

61. A BJT has $I_B = 50\ \mu A$ and $I_C = 2.7$ mA. The value of 'α' is given by :

(a) 0.949 (b) 54

(c) 0.018 (d) 0.982

62. In a differential amplifier, CMRR can be improved by using an increased :

(a) Emitter resistance (b) Collector resistance

(c) Power supply voltage (d) Source resistance

63. Tunnel diode is a P-N diode with :

(a) very high doping in *p*-region

(b) very high doping in *n*-region

(c) very high doping in *p* and *n*-region both

(d) low doping in *p* and *n*-region both

64. Which of the following has the highest input impedance ?

(a) CE-BJT (b) CC-BJT

(c) JFET (d) CMOS

65. A *pn-pn* diode is a :

(a) Negative resistance device

(b) Voltage controlled device

(c) Controlled rectifier

(d) Current controlled device

66. Mobility of an electron in a conductor is expressed in terms of :

(a) Cm-V/s (b) Cm^2-V/s

(c) Cm^2/V-s (d) Cm^2/s

67. The MOSFET switch in its ON-state may be considered equivalent to :

(a) Resistor (b) Inductor

(c) Capacitor (d) Battery

68. A two-stage amplifier with negative feedback has an overshoot when damping factor 'K' is :

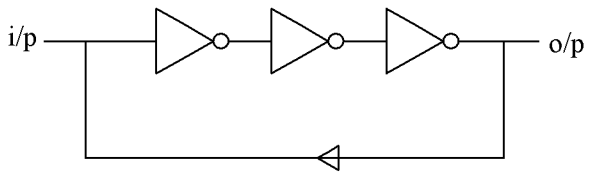
(a) $K < 1$

(b) $K > 1$

(c) Negative

(d) Zero

69. The circuit shown works as :



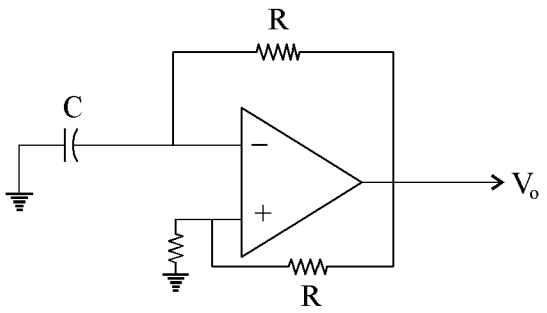
(a) Oscillating circuit and output is a square wave

(b) Stable circuit whose output = 0

(c) Stable circuit whose output = 1

(d) Single pulse of 3 times propagation delay

70. For the circuit shown, the time period of oscillation is given by :



(a) $T = \tau \ln R$ (b) $T = 2\tau \ln R$

(c) $T = \tau \ln 2$ (d) $T = 2\tau \ln 2$

71. Silicon diodes are less suited for low voltage rectifier operation because :

(a) it cannot withstand high temperature

(b) its reverse saturation current is low

(c) its cut-in voltage is high

(d) its breakdown voltage is high

72. Which one of the following type of negative feedback increases the input resistance and decreases the output resistance of an amplifier ?

(a) Current series feedback

(b) Voltage series feedback

(c) Current shunt feedback

(d) Voltage shunt feedback

73. T-flip-flop toggles when :

(a) J = 0, K = 0 (b) J = 1, K = 0

(c) J = 1 = K (d) J = 0, K = 1

74. In S-R flip-flop, previous state is retained at :

(a) S = R = 0 (b) S = R = 1

(c) S = 1, R = 0 (d) S = 0, R = 1

75. R-2R ladder network is used in :

(a) ADC (b) DAC

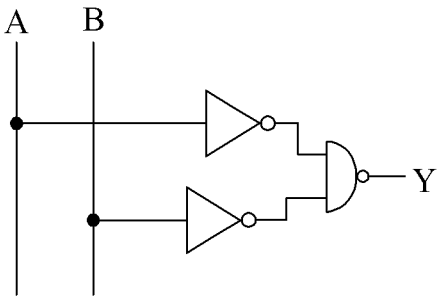
(c) Counter (d) Ring counter

76. Maximum clock frequency in 8085 microprocessor is :

(a) 10 MHz (b) 6 MHz

(c) 3 MHz (d) 9 MHz

77. The circuit shown realizes a :



(a) Y = A + B (b) Y = A.B

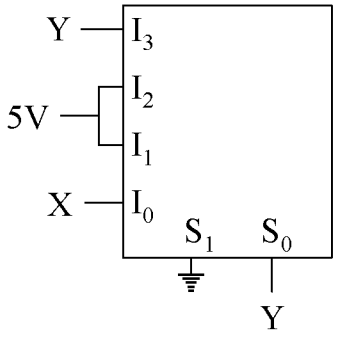
(c) Y = A ⊕ B (d) $Y = \overline{A} + \overline{B}$

78. IC 7486 represents :

(a) OR gate (b) AND gate

(c) Ex-OR gate (d) NAND gate

79. The output of 4 : 1 multiplexer is :



(a) $\overline{X} + \overline{Y}$ (b) $X + Y$

(c) $\overline{X}\overline{Y} + X$ (d) $X\overline{Y}$

80. In a microprocessor, the register which holds address of the next instruction to be fetched is :

(a) Accumulator (b) Program counter

(c) Stack pointer (d) Instruction register

81. The spectral density of white noise is :

(a) Exponential (b) Uniform

(c) Poisson (d) Gaussian

82. A voice reproduction via PCM requires 128 quantisation levels. If the bandwidth of voice channel is 4 kHz, the data rate is given by :

(a) 256 kbps (b) 128 kbps

(c) 28 kbps (d) 56 kbps

83. If the peak power of the pulsed microwave system = 10 kW and average power is 800 W, the duty cycle will be :

(a) 80% (b) 8%

(c) 0.8% (d) 0.08%

84. If the carrier modulated by a digital bit stream has possible phase of 0°, 90°, 180° and 270°, this type of modulation is given by :

(a) QPSK (b) BPSk

(c) QAM (d) MSK

85. Frequency frogging is used in carrier system to :

(a) Conserve frequencies

(b) Reduce distortion

(c) Reduce cross talk

(d) Save power

86. VSB transmission is used in :

(a) Radio transmission (b) FM

(c) TV transmission (d) Data transmission

87. Wave impedance is represented by :

(a) $\frac{1}{\sqrt{\mu \in}}$ (b) $\sqrt{\frac{\mu}{\in}}$

(c) $\sqrt{\frac{\in}{\mu}}$ (d) $\sqrt{\mu \in}$

88. The inconsistency of continuity equation for time varying fields was connected by Maxwell and the correction applied was :

(a) Gauss' law

(b) Faraday's law

(c) Ampere's law, $\frac{\partial D}{\partial t}$

(d) Lenz's law

89. The depth of penetration of a wave in a lossy dielectric increases with increase in :

(a) Conductivity

(b) Permeability

(c) Wavelength

(d) Permittivity

90. If the velocity of EM wave in free space = 3×10^8 m/s, the velocity of wave in a medium with $\epsilon_r = 4.5$ and $\mu_r = 2$ would be :

(a) 1×10^8 m/s (b) 3×10^8 m/s

(c) 9×10^8 m/s (d) 27×10^8 m/s

91. Phase velocity (v_p) and group velocity (v_g) in a waveguide is related by :

(a) v_p/v_g = Constant

(b) $v_p + v_g$ = Constant

(c) $v_p + v_g = c$

(d) $v_p.v_g = c^2$

92. In a airfilled rectangular waveguide of dimension 6×4 cm^2, the cut off frequency for TE_{10} is given by :

(a) 25 GHz (b) 2.5 GHz

(c) 25 MHz (d) 5 GHz

93. A helical antenna is used for satellite tracking because of its :

(a) Maneuverability (b) Circular polarisation

(c) Broad bandwidth (d) Good front to back ratio

94. A waveguide section in a microwave circuit works as :

(a) Low pass filter (b) Band pass filter

(c) H.P.F. (d) Band stop filter

95. The transfer function of a zero-order hold system is :

(a) $\frac{1}{s}\left(1+e^{-st}\right)$ (b) $\frac{1}{s}\left(1-e^{-st}\right)$

(c) $1-\frac{1}{s}e^{-st}$ (d) $1+\frac{1}{s}e^{-st}$

96. The response C(t) of a system to an input $r(t)$ is given by the differential equation :

$$\frac{d^2c(t)}{dt^2}+3\frac{dc(t)}{dt}+5c(t)=5r(t)$$

The transfer function is given by :

(a) $G(s)=\frac{1}{s^2+3s+5}$

(b) $G(s)=\frac{3s}{s^2+3s+5}$

(c) $G(s)=\frac{5}{s^2+3s+5}$

(d) $G(s)=\frac{s+3}{s^2+3s+5}$

97. Consider a unity feedback control system with open-loop transfer function $G(s)=\frac{K}{s(s+1)}$. The steady state error due to unit step function is :

(a) K (b) Zero

(c) $\frac{1}{K}$ (d) Infinity

98. The Z-transform of a signal is given by $C(z)=\frac{z^{-1}(1-z^{-4})}{4(1-z^{-1})^2}$. Its final value is :

(a) $\frac{1}{4}$

(b) 1

(c) Zero

(d) Infinity

99. The characteristic polynomial of a system is :

$Q(s) = 2s^5 + s^4 + 4s^3 + 3s^2 + 2s + 1.$

The system is :

(a) Stable

(b) Marginally stable

(c) Unstable

(d) Oscillatory

100. Phase margin of a system is used to specify :

(a) Relative stability

(b) Absolute stability

(c) Time response

(d) Frequency response