M/P ENT - 11

Total No. of Pages : 12

Seat No.	

M.Phil/Ph.D. Entrance Examination, September - 2022

ENGINEERING AND TECHNOLOGY

Electronics Engineering (For M.E./M.Tech. Students)

Sub. Code: 58747

Day and Date : Saturday, 24-09-2022 **Total Marks : 100**

Time : 10.00 a.m. 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) **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.**

RESEARCH METHODOLOGY

1) An observation technique where the researcher himself actively remains associated with other members of the group and observes the behaviour and activities of the group of study is known as:

   A) Quasi participant observation
   B) Non participant observation
   C) Participant observation
   D) None of the above

2) One step that is not included in planning a research study is:

   A) Identifying a researchable problem.
   B) A review of current research.
   C) Statement of the research question.
   D) Developing a research plan.

3) Research towards finding causes or variables responsible for the origin, existence and subsistence of problem which is known as a —

A) Explanatory research
B) Diagnostic research
C) Comparative research
D) Remedial research

4) Citation of original source, available within text of the writing is called —

A) Hypertext referencing
B) Parenthetical Referencing
C) In-text Referencing
D) Paragraph Referencing

5) A research intends to explore the result of possible factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for this study?

A) Descriptive survey method
B) Historical method
C) Ex-post facto method
D) Experimental method

6) What does the longitudinal research approach actually deal with?

A) Long-term research
B) Short-term research
C) Horizontal research
D) None of the above

7) Which one is called non-probability sampling?

A) Quota sampling
B) Cluster sampling
C) Systematic sampling
D) Stratified random sampling

8) Research problem is selected from the standpoint of

A) Social relevance
B) Financial support
C) Researcher's interest
D) Availability of relevant literature

9) A reasoning where we start with certain particular statements and conclude with a universal statement is called

A) Deductive Reasoning
B) Inductive Reasoning
C) Abnormal Reasoning
D) Transcendental Reasoning

10) Testing hypothesis is a _____

A) Inferential statistics
B) Descriptive statistics
C) Data preparation
D) Data analysis

11) The concrete observable events which represent the abstract concepts or constructs are called

A) Data
B) Sample
C) Variable
D) Proposition

12) Objectives in problem formulation means

A) Questions to be answered
B) Methods
C) Techniques
D) Methodology

13) Which of the following is not a role of hypothesis?

A) Guides the direction of the study
B) Determine feasibility of conducting the study
C) Identifies relevant and irrelevant facts
D) Provides framework for organizing the conclusions

14) Research related to abstract ideas or concepts is

A) Empirical research
B) Conceptual research
C) Quantitative research
D) Qualitative research

15) The qualitative research strategy places a value on:

A) Using numbers, measurements and statistical techniques

B) Generating theories through inductive research about social meanings

C) Conducting research that is of a very high quality

D) All of the above

16) An inductive theory is one that:

A) Involves testing an explicitly defined hypothesis

B) Does not allow for findings to feed back into the stock of knowledge

C) Uses quantitative methods whenever possible

D) Allows theory to emerge out of the data

17) In a study, subjects are randomly assigned to one of three groups: control, experimental A, or experimental B, After treatment, the mean scores for the groups are compared. The appropriate statistical test for comparing these means is:

A) the correlation coefficient

B) chi square

C) the t-test

D) the analysis of variance

18) Action research means

A) A longitudinal research

B) An applied research

C) A research initiated to solve an immediate problem

D) A research with socioeconomic objective

19) Which of the following is the most common example of a situation for which the parameter of interest is a population proportion?

A) A binomial experiment

B) A normal experiment

C) A randomized experiment

D) An observational study

20) The null and alternative hypotheses divide all possibilities into:
   A) two sets that overlap
   B) two non-overlapping sets
   C) two sets that may or may not overlap
   D) as many sets as necessary to cover all possibilities

21) One-way ANOVA is used when:
   A) analyzing the difference between more than two population means
   B) analyzing the results of a two-tailed test
   C) analyzing the results from a large sample
   D) analyzing the difference between two population means

22) In which one of the following stage researcher consult the literature?
   A) Operation test
   B) Response analysis survey
   C) Document design analysis
   D) Pre-test interviews

23) Questionnaire is a:
   A) Research method
   B) Measurement technique
   C) Tool for data collection
   D) Data analysis technique

24) The chi-square goodness-of-fit test can be used to test for:
   A) significance of sample statistics
   B) difference between population means
   C) normality
   D) probability

25) Which of the following is an example of primary data?
   A) Book
   B) Journal
   C) News Paper
   D) Census Report

SUBJECT SPECIFIC

26) In an 8085 microprocessor, the contents of the accumulator and the carry flag are A7 (in hex) and 0, respectively. If the instruction RLC is executed, then the contents of the accumulator (in hex) and the carry flag, respectively, will be

A) 4E and 0
B) 4E and 1
C) 4F and 0
D) 4F and 1

27) In IC technology, dry oxidation (using dry oxygen) as compared to wet oxidation (using steam or water vapour) produces

A) superior quality oxide with a higher growth rate
B) inferior quality oxide with a higher growth rate
C) inferior quality oxide with a lower growth rate
D) superior quality oxide with a lower growth rate

28) Sample-and-hold circuits in ADCs are designed to:

A) sample and hold the output of the binary counter during the conversion process
B) stabilize the ADCs threshold voltage during the conversion process
C) stabilize the input analog signal during the conversion process
D) sample and hold the ADC staircase waveform during the conversion process

29) Consider an air-filled rectangular waveguide with dimensions a = 2.286 cm and b = 1.016 cm. The increasing order of the cut-off frequencies for different modes is

A) $TE_{01} < TE_{10} < TE_{11} < TE_{20}$
B) $TE_{20} < TE_{11} < TE_{10} < TE_{01}$
C) $TE_{10} < TE_{20} < TE_{01} < TE_{11}$
D) $TE_{10} < TE_{11} < TE_{20} < TE_{01}$

30) In a MOSFET operating in the saturation region, the channel length modulation effect causes

A) an increase in the gate-source capacitance

B) a decrease in the Transconductance

C) a decrease in the unity-gain cutoff frequency

D) a decrease in the output resistance

31) The return loss of a device is found to be 20 dB. The voltage standing wave ratio (VSWR) and magnitude of reflection coefficient are respectively

A) 1.22 and 0.1

B) 0.81 and 0.1

C) –1.22 and 0.1

D) 2.44 and 0.2

32) Norton's theorem states that a complex network connected to a load can be replaced with an equivalent impedance

A) in series with a current source

B) in parallel with a voltage source

C) in series with a voltage source

D) in parallel with a current source

33) The directivity of an antenna array can be increased by adding more antenna elements, as a larger number of elements

A) improves the radiation efficiency

B) increases the effective area of the antenna

C) results in a better impedance matching

D) allows more power to be transmitted by the antenna

34) A silicon PN junction is forward biased with a constant current at room temperature. When the temperature is increased by 10°C, the forward bias voltage across the PN junction

A) increases by 60 mV

B) decreases by 60 mV

C) increases by 25 mV

D) decreases by 25 mV

35) The trigonometric Fourier series of an even function does not have the

A) dc term
B) cosine terms
C) sine terms
D) odd harmonic terms

36) Which one of the following statements about differential pulse code modulation (DPCM) is true?

A) The sum of message signal sample with its prediction is quantized
B) The message signal sample is directly quantized, and its prediction is not used
C) The difference of message signal sample and a random signal is quantized
D) The difference of message signal sample with its predictions is quantized

37) In a DRAM,

A) periodic refreshing is not required
B) information is stored in a capacitor
C) information is stored in a latch
D) both read and write operations can be performed simultaneously

38) An npn bipolar junction transistor (BJT) is operating in the active region. If the reverse bias across the base — collector junction is increased, then

A) the effective base width increases and common — emitter current gain increases
B) the effective base width increases and common — emitter current gain decreases
C) the effective base width decreases and common — emitter current gain increases
D) the effective base width decreases and common — emitter current gain decreases

39) Which of the following statements is incorrect?

A) Lead compensator is used to reduce the settling time.

B) Lag compensator is used to reduce the steady state error.

C) Lead compensator may increase the order of a system.

D) Lag compensator always stabilizes an unstable system

40) Consider an air-filled rectangular waveguide with dimensions a = 2.286 cm and b=1.016 cm. At 10 GHz operating frequency, the value of the propagation constant (per meter) of the corresponding propagating mode is _____

A) 120 B) 210

C) 157 D) 215

41) Negative feedback in a closed-loop control system DOES NOT

A) reduce the overall gain

B) reduce bandwidth

C) improve disturbance rejection

D) reduce sensitivity to parameter variation

42) The determinant of matrix A is 5 and the determinant of matrix B is 40. The determinant of matrix AB is _____

A) 200 B) 100

C) 300 D) 400

43) Consider the following statements for a metal oxide semiconductor field effect transistor (MOSFET):

P : As channel length reduces, OFF-state current increases.

Q : As channel length reduces, output resistance increases.

R : As channel length reduces, threshold voltage remains constant.

S : As channel length reduces, ON current increases.

Which of the above statements are INCORRECT?

A) P and Q B) P and S

C) Q and R D) R and P

44) The minimum number of 2-input NAND gates required to implement a 2-input XOR gate is

A) 4 B) 5

C) 6 D) 7

45) In CMOS technology, shallow P-well or N-well regions can be formed using

A) low pressure chemical vapour deposition

B) low energy sputtering

C) low temperature dry oxidation

D) low energy ion-implantation

46) Which resistive component is designed to be temperature sensitive?

A) Thermistor B) Rheostat

C) Potentiometer D) Photoconductive cell

47) Once a PAL has been programmed:

A) it cannot be reprogrammed

B) its outputs are only active HIGHs

C) its outputs are only active LOWs

D) its logic capacity is lost

48) In a parallel RLC circuit, which value may always be used as a vector reference?

A) Current B) Reactance

C) Resistance D) Voltage

49) If a right-handed circularly polarized wave is incident normally on a plane perfect conductor, then the reflected wave will be

A) right-handed circularly polarized

B) left-handed circularly polarized

C) elliptically polarized with a tilt angle of 45°

D) horizontally polarized

50) As frequency increases

A) both series and parallel RC impedance decrease

B) series RC impedance decreases and parallel RC impedance increases

C) series RC impedance increases and parallel RC impedance decreases

D) both series and parallel RC impedance increase

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Rough Work