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PD-34

Total No. of Pages : 12

Ph.D. Entrance Examination, 2025
ENGINEERING AND TECHNOLOGY
ELECTRONICS ENGINEERING
Sub. Code : 58747

Day and Date : Tuesday, 09-09-2025

Total Marks : 100

Time : 04.00 p.m. to 6.00 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.

RESEARCH METHODOLOGY

1. A research problem is feasible only when:
 - A) it has utility and relevance
 - B) it is researchable
 - C) it is new and adds something to knowledge
 - D) all the above
2. The main characteristic of scientific research is:
 - A) Empirical
 - B) Theoretical
 - C) Experimental
 - D) all of the above
3. Bibliography given in a research report:
 - A) shows vast knowledge of the researcher
 - B) helps those interested in further research
 - C) has no relevance to research
 - D) all the above

4. The research is always -
- A) verifying the old knowledge
 - B) exploring new knowledge
 - C) filling the gap between knowledge
 - D) all of these
5. Who defined "Research is a systematic, controlled, empirical and critical investigation of hypothetical relations among natural phenomena"?
- A) Black and Champion
 - B) Kerlinger
 - C) Creswell
 - D) L.V. Redman and A.V.H. Morry
6. Which of the following is a final stage of a research?
- A) Preparation of the report
 - B) Analysis of Data
 - C) Hypothesis Testing
 - D) Generalization and Interpretation
7. In order to pursue the research, which of the following is priorly required?
- A) Developing a research design
 - B) Formulating a research question
 - C) Deciding about the data analysis procedure
 - D) Formulating a research hypothesis
8. What is the name of the conceptual framework in which the research is carried out?
- A) Research hypothesis
 - B) Synopsis of Research
 - C) Research paradigm
 - D) Research design
9. In a research report, bibliography is included in
- A) Introduction part
 - B) Main body
 - C) End matter
 - D) None of these

10. If the researcher is not familiar with the research problem, then which study is conducted to acquire knowledge of the subject
 - A) Pre testing
 - B) Pilot study
 - C) Detailed study
 - D) Analytical study
11. Which is the main objective of research
 - A) To review the literature
 - B) To summarise what is already known
 - C) To get an academic degree
 - D) To discover new facts or to make fresh interpretation of known facts
12. Authenticity of a research finding is its:
 - A) Originality
 - B) Validity
 - C) Objectivity
 - D) All of the above
13. A common test in research demands much priority on
 - A) Reliability
 - B) Usability
 - C) Objectivity
 - D) All of the above
14. Review of literature means?
 - A) Documentation of referenced material
 - B) Overview of the previously published works on specific topic
 - C) Formation of a theoretical framework
 - D) Elucidating and testing hypothesis
15. Reliability is the fundamental quality of a research which also reflects
 - A) Superiority
 - B) Purity of data
 - C) Verifiability
 - D) Validity

16. The study in which the investigators attempt to trace an effect is known as:

- A) Survey Research
- B) Summative Research
- C) Historical Research
- D) 'Ex-post Facto' Research

17. Evaluation research is concerned with

- A) Why are we doing?
- B) What are we doing?
- C) How well are we doing?
- D) None of the above

18. Random sampling is helpful as it is

- A) Reasonably accurate
- B) Free from personal biased
- C) An economical method of data collection
- D) All the above.

19. Which of these is not a step in the problem identification process?

- A) Discussion with subject experts
- B) Review of existing literature
- C) Theoretical foundation and model building
- D) Management decision making

20. Action-research is:

- A) An applied research
- B) A research carried out to solve immediate problems
- C) A longitudinal research
- D) All the above

21. 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
22. The conclusions/findings of which type of research cannot be generalized to other situations?
- A) Casual Comparative Research
 - B) Historical Research
 - C) Descriptive Research
 - D) Experimental Research
23. How can we enhance the research objective?
- A) By making it more valid
 - B) By making it more reliable
 - C) By making it more impartial
 - D) All of the above
24. The format of thesis writing is the same as in
- A) Writing of Seminar representation
 - B) Preparation of research paper/article
 - C) A research dissertation
 - D) Presenting a workshop/conference paper
25. Which of the following options are the main tasks of research in modern society?
- A) To learn new things
 - B) To keep pace with the advancement in knowledge
 - C) To systematically examine and critically analyze the investigations/sources with the objective
 - D) All of the above

SUBJECT SPECIFIC

26. A master slave flip flop has the characteristic that
- A) change in the output immediately reflected in the output
 - B) change in the output occurs when the state of the master is affected
 - C) change in the output occurs when the state of the slave is affected
 - D) both the master and the slave states are affected at the same time
27. The range of signed decimal numbers that can be represented by 6-bits 1's complement number is
- A) -31 to +31
 - B) -63 to +63
 - C) -64 to +63
 - D) -32 to +31
28. A digital system is required to amplify a binary-encoded audio signal. The user should be able to control the gain of the amplifier from minimum to a maximum in 100 increments. The minimum number of bits required to encode, in straight binary, is
- A) 8
 - B) 6
 - C) 5
 - D) 7
29. An AM signal and a narrow-band FM signal with identical carriers, modulating signals and modulation indices of 0.1 are added together. The resultant signal can be closely approximated by
- A) broadband FM
 - B) SSB with carrier
 - C) DSB-SC
 - D) SSB without carrier
30. The minimum number of comparators required to build an 8-bits flash ADC is
- A) 8
 - B) 63
 - C) 255
 - D) 256

31. Which of the following is NOT associated with a p – n junction?
- A) Junction Capacitance:
 - B) Charge Storage Capacitance
 - C) Depletion Capacitance
 - D) Channel Length Modulations
32. In a transconductance amplifier, it is desirable to have
- A) a large input resistance and a large output resistance
 - B) a large input resistance and a small output resistance
 - C) a small input resistance and a large output resistance
 - D) a small input resistance and a small output resistance
33. Under low level injection assumption, the injected minority carrier current for an extrinsic semiconductor is essentially the
- A) Diffusion current
 - B) Drift current
 - C) Recombination current
 - D) Induced current
34. A rectangular waveguide of internal dimensions (a 4 cm and b = 3 cm) is to be operated in TE mode. The minimum operating frequency is
- A) 6.25 GHz
 - B) 6.0 GHz
 - C) 5.0 GHz
 - D) 3.75 GHz
35. The full form of the abbreviations TTL and CMOS in reference to logic families are
- A) Triple Transistor Logic and Chip Metal Oxide Semiconductor
 - B) Tristate Transistor Logic and Chip Metal Oxide Semiconductor
 - C) Transistor Transistor Logic and Complementary Metal Oxide Semiconductor
 - D) Tristate Transistor Logic and Complementary Metal Oxide Silicon

36. In a microprocessor, the service routine for a certain interrupt starts from a fixed location of memory which cannot be externally set, but the interrupt can be delayed or rejected such an interrupt is
- A) non-maskable and non-vectored
 - B) maskable and non-vectored
 - C) non-maskable and vectored
 - D) maskable and vectored
37. For parallel RLC circuit, which one of the following statements is NOT correct?
- A) The bandwidth of the circuit decreases if R is increased
 - B) The bandwidth of the circuit remains same if L is increased
 - C) At resonance, input impedance is a real quantity
 - D) At resonance, the magnitude of input impedance attains its minimum values
38. A Zener diode, when used in voltage stabilization circuits, is biased in
- A) reverse bias region below the breakdown voltage
 - B) reverse breakdown region
 - C) forward bias region
 - D) forward bias constant current mode
39. 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 60mV
 - B) decreases by 60mV
 - C) increases by 25mV
 - D) decreases by 25mV

40. A transmission line has a characteristic impedance of $50\ \Omega$ and a resistance of $0.1\ \Omega/\text{m}$. If the line is distortion less, the attenuation constant (in Np/m) is
- A) 500 B) 5
C) 0.014 D) 0.002
41. What are the minimum number of 2-to-1 multiplexers required to generate a 2-input AND gate and a 2-input Ex-OR gate
- A) 1 and 2 B) 1 and 3
C) 1 and 1 D) 2 and 2
42. The built-in potential of the junction
- A) is 0.70 V
B) is 0.76 V
C) is 0.82 V
D) Cannot be estimated from the data given
43. If the positive values of the signal are uniformly quantized with a step size of 0.05V, and the negative values are uniformly quantized with a step size of 0.1 V, the resulting signal to quantization noise ratio is approximately
- A) 46 dB B) 43.8 dB
C) 42 dB D) 40 dB
44. What are the minimum numbers of NOT gates and 2-input OR gates required to design the logic of the driver for this 7-Segment display
- A) 3 NOT and 4 OR
B) 2 NOT and 4 OR
C) 1 NOT and 3 OR
D) 2 NOT and 3 OR

50. Following is the segment of a 8085 assembly language program

```
LXI SP, EFFF H
CALL 3000 H
:
:
:
3000 H LXI H, 3CF4
PUSH PSW
SPHL
POP PSW
RET
```

On completion of RET execution, the contents of SP is

- | | |
|-----------|-----------|
| A) 3CF0 H | B) 3CF8 H |
| C) EFFD H | D) EFFF H |

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- Rough Work -