Seat No.

SHIVAJI UNIVERSITY, KOLHAPUR
Ph.D. Entrance Examination, February-2024
ELECTRONICS
Sub Code: 58799

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Day and Date : Wednesday, 07-02-2024   **Total Marks : 100**
Time : 4.00 p.m. to 6.00 p.m.

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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.

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1. Which of the following best describes the purpose of conducting research?

   A) To prove preconceived notions

   B) To gather evidence and generate new knowledge

   C) To confirm personal beliefs

   D) To validate popular opinions

2. What is the significance of a literature review in research?

   A) It provides an opportunity to showcase the researcher's writing skills.

   B) It helps to identify gaps in existing knowledge and informs the research question.

   C) It serves as a platform for presenting personal opinions on the topic.

   D) It ensures that the research adheres to a specific writing style.

3. Which of the following is a characteristic of qualitative research?

    A) It primarily relies on numerical data analysis.

    B) It focuses on establishing cause-and-effect relationships.

    C) It emphasizes understanding human behaviour in context.

    D) It involves large sample sizes for statistical significance.

4. What is the purpose of formulating a research hypothesis?

    A) To prove the researcher's bias

    B) To provide a tentative explanation for observed phenomena

    C) To limit the scope of the research project

    D) To guarantee the success of the research study

5. Which of the following is a key characteristic of a valid research design?

    A) Flexibility in data collection methods

    B) Avoidance of systematic errors or biases

    C) Emphasis on subjective interpretations

    D) Replication of previous studies

6. In research methodology, what does the term "reliability" refer to?

    A) The extent to which a study's findings can be generalized

    B) The ability of the research design to measure what it intends to measure consistently

    C) The statistical significance of the research results

    D) The degree of correlation between variables

7. If CAT is coded as PATC, JOY is coded as POYJ; similarly the word WING will be coded as -

    a. PIGNW   b. PINGW

    c. PGNIW   d. PIWGN

8. What will be the missing number in the series 196, 169, 144, ..., 100, 817

a. 121

b. 120

c. 119

d. 118

9. If PINK is coded as 1691411, then RED will be coded as

a. 1963

b. 1854

c. 1853

d. 1954

10. When is it necessary to cite a source?

a. When your ideas build on someone else's.

b. When you are paraphrasing someone else's ideas.

c. When you use someone else's words.

d. All of the above.

11. The role of a project supervisor is to:

a) give you a reading list.

b) provide academic support, guidance and critical feedback on your work.

c) negotiate access to the research setting on the student's behalf.

d) ensure you keep to your schedule and deadlines.

12. Most essential quality of a researcher is

a. punctuality

b. intelligence

c. genuine interest in research

d. mastery over own subject

13. .... represents instrument's degree of repeatability, ie, how reliably it can reproduce the same measurement over and over.

a) Accuracy,

b) Resolution,

c) Precision,

d) Range

14. Consider a digital oscilloscope, which has an 8 bit AD converter. If the vertical sensitivity is set to 100 mV/div and the number of divisions is 8, the total range will be

    a) 800 mV,   b) 64mV

    c) 6400mV   d) 1000mV

15. A thermistor is made up of material.

    a) Conductor   b) Insulator

    c) Semiconductor   d) None of the above

16. LDR sensor is abbreviated as

    a) Light Dependent Resistor   b) Light Determinant Resistor

    c) Load Determinant Resistor d) None of the above

17. In the International System of Units (SI), electric potential is expressed in units of ....

    a) Amperes   b) Volts

    c) Watts   d) Joules

18. .... is the first and initial phase of the Prototype Model.

    a) Problem identification   b) Design

    c) Testing   d) All of the above

19. In MATLAB, which command is used to clear command window?

    A) clear   B) close all

    C) clear all   D) clc

20. Acronym of HFSS is for ....

    A) High Frequency Structural Stimulator

    B) High Frequency Synthesis Software

    C) High Frequency System Software

    D) High Frequency Stimulating Software

21. .... involves delivering different types of services over the Internet.

   A) Physical computing   B) Chemical computing

   C) Mechanism   D) Cloud computing

22. What does API stand for?

   A) Application Programming Interface

   B) Android Programming Interface

   C) Android Page Interface

   D) Application Page Interface

23. What is NS-3?

   A) Discrete-event network simulator

   B) Continuous-event network simulator

   C) Discrete-event natural simulator

   D) Continuous-event natural simulator

24. IE3D is used for

   A) Only antenna design

   B) Only RFID design

   C) Only MMIC design

   D) Antenna, RFID and MMIC design.

25. PSPICE stands for

   A) Personal Simulation Program with Integrated Circuit Emphasis

   B) Personal Software Program with Integrated Circuit Emphasis

   C) Personal Simulation Program with International Circuit Emphasis

   D) Personal Program with International Circuit Emphasis

26. ....convert deformation of an object into electrical resistance.

   a) Motor   b) Strain gauge

   c) Generator   d) Galvanometer

27. A .... device prevents the oscillation of the moving system and enables the latter to reach its final position quickly.

   A) deflecting   B) damping

   C) controlling   D) all of the above

28. he modes of propagation supported by a rectangular wave guide is:

   a) TM, TEM, TE modes   b) TM, TE

   c) TM, TEM   d) TE, TEM

29. A hollow rectangular waveguide cannot propagate TEM waves because:

   a) of the existence of only one conductor

   b) of the losses caused

   c) It is dependent on the type of the material used

   d) None of the mentioned

30. Von-Neumann Bottleneck problem can be minimized by

   a) Introducing cache memory.

   b) Using branch prediction algorithms

   c) Using modern programming techniques (such as OOP)

   d) All of the above

31. .... is well suited to parallel or vector processing, in which a very large set of data can be divided into parts that are individually subjected to identical but independent operations.

   a) SMD multiprocessing   b) SIMD multiprocessing

   c) SIM multiprocessing   d) All of the above

32. In digital design, what is the primary function of a multiplexer (MUX)?

   A) To perform arithmetic operations

   B) To store data temporarily

   C) To select one of many input signals and route it to the output

   D) To synchronize clocks in different parts of the circuit

33. What role does Hardware Description Language (HDL) play in digital design?

A) It provides a graphical representation of the circuit layout

B) It facilitates communication between hardware and software components

C) It allows designers to describe the behavior and structure of digital systems

D) It ensures compatibility between different digital design tools

34. A voice signal has 4 KHz as a maximum frequency. Find sampling frequency.

A) 2 KHz   B) 4 KHz

C) 8 KHz   D) 16 KHz

35. Fourier Transform of an impulse signal, $\delta(t)$

A) 1   B) 1/f

C) f   D) ∞

36. TE_{00} mode for a rectangular waveguide:

a) Exists

b) Exists but defined only under special cases

c) Does not exist

d) Cannot be determined

37. For dominant mode propagation in TE mode, if the rectangular waveguide has a broader dimension of 31.14 mm, then the cutoff wave number:

a) 100   b) 500

c) 50   d) 1000

38. What is the primary function of a thyristor in an inverter circuit?

A) To regulate the output voltage

B) To convert DC power to AC power

C) To store energy temporarily

D) To provide short-circuit protection

39. Which type of inverter topology typically uses thyristors for switching?

   A) Voltage source inverter (VSI)

   B) Current source inverter (CSI)

   C) Pulse width modulation (PWM) inverter

   D) Multilevel inverter

40. Monolithic integration for optical sources are confined to the use of........
    semiconductors.

   a) III-V   b) II-III

   c) I-II   d) VII-VIII

41. Circuits fabricated from GaAs or AlGaAs operate in wavelength region of

   a) 0.1 and 0.2 µm   b) 0.8 and 0.9 µm.

   c) 0.4 and 0.6 µm   d) 0.6 and 0.7 µm

42. A system can be completely described by a transfer function if it is ....

   A) Nonlinear and continuous

   B) Linear and time-varying

   C) Nonlinear and time-invariant

   D) Linear and time-invariant

43. The system with transfer function, $\frac{1}{s(s+2)}$ is:

   A) Type 0 and order 1   B) Type 1 and order 1

   C) Type 0 and order 2   D) Type I and order 2

44. Which of following provides reliable communication?

   a. TCP   b. IP

   c. UDP   d. All of the above

45. DNS is the abbreviation of

   a. Dynamic Name System   b. Dynamic Network System

   c. Domain Name System   d. Domain Network Service

46. Which operational feature of PIC allows it to reset especially when the power supply drops the voltage below 4V2

    a.   Built-in Power-on-reset   b.   Brown-out reset

    c.   Both a & b   d.   None of the above

47. 8 input DAC has

    a)   8 discrete voltage levels   b)   64 discrete voltage levels

    c)   124 discrete voltage levels   d)   256 discrete voltage levels

48. If the output of the system at any 'n' depends only the present or the past values of the inputs then the system is said to be ....

    A)   Linear   B)   Non-linear

    C)   Causal   D)   Non-causal

49. 11.   The excess-3 code for decimal 597 is given by ....

    a)   100011001010   b)   100010100111

    c)   010110010111   d)   010110101101

50. .... uses up processor cycles when no other activity is present, keeps CPU in known state.

    a)   startup task   b)   logging task

    c)   debug agent task   d)   idle task

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