The ICFAI University, Dehradun
Ph.D. Entrance Examination, 2024
IUDRET-2024
Question Booklet

ELECTRONICS AND COMMUNICATION ENGINEERING

BOOKLET NO.: 666751

Signature and Name of Invigilators

1. (Signature): _____

   (Name): _____

   OMR Sheet No.: ....

   (To be filled by the Candidate)

2. (Signature): _____

   (Name): _____

   Application No. : ....

   (To be filled by the Candidate)

Time: 2 Hours

Number of Pages in this Booklet: 07

Maximum Marks: 50

Number of Questions in this Booklet: 50

General Instructions: -

1. Write the application number in the space provided.
2. This question booklet consists of fifty multiple-choice types of questions.
3. At the commencement of the examination, the question booklet will be given to you. In the first five minutes, you are required to open the question booklet and compulsorily examine it as below:
   (i) To have access to the question booklet, tear off the paper seal on the edge of this cover page. Do not accept a question booklet without a sticker seal and do not accept an open question booklet.
   (ii) Tally the number of pages and a number of questions in the booklet with the information printed on the cover page. A faulty question booklet due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be replaced immediately by a correct booklet from the invigilators within five minutes. Afterward, neither the question booklet will be replaced nor any extra time will be given.
   (iii) After this verification is over, the OMR Sheet Number should be entered into this question booklet.
4. Each item has four alternative responses marked (A), (B), (C), and (D). You have to darken the circle as indicated below on the correct response against each item.
   Example: Ⓐ Ⓑ ● Ⓓ where (C) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Sheet.** It will not be evaluated if you mark at any place other than in the circle in the OMR Sheet.
6. Rough Work is to be done in the space provided in the question booklet.
7. Before leaving the examination hall, candidate is required to return the question booklet and OMR sheet to the invigilators at the end of the examination compulsorily.
8. Use only Blue/Black Ball point pen.
9. Use of any calculator or log table etc., is prohibited.
10. There is no negative marking for incorrect answer.

Note: This question booklet contains **fifty (50)** objective-type questions, each carrying one (01) mark.

1. Research is

   (A) A purposeful, systematic activity

   (B) Conducted for purely academic purposes

   (C) Conducted to answer questions about practical issues

   (D) A random, unplanned process of discovery

2. Qualitative research is

   (A) Without any specific purpose

   (B) Primarily concerned with in-depth exploration of phenomena

   (C) Deals with the collection and analysis of numerical data

   (D) Dependent upon spiritual aspects only

3. The quality of the research journal is indicated by its ....

   (A) h-index

   (B) g-index

   (C) Impact factor

   (D) i10-index

4. Research can be classified as
   (A) Basic, applied, and action research
   (B) Quantitative and qualitative research
   (C) Philosophical, historical, survey, and experimental research.
   (D) All the above

5. Which of the following can best be described as an ordinal variable?
   (A) Gender
   (B) Rank
   (C) Color
   (D) Religion

6. The correlation coefficient describes
   (A) Only magnitude
   (B) Both magnitude and direction
   (C) Only direction
   (D) None of the above

7. .... plagiarism is allowed as per UGC Regulations, 2018
   (A) 10%
   (B) 20%
   (C) 40%
   (D) 25%

8. Arrange the following sections of a research report in correct sequence

   1. Abstract   2. Results

   3. Introduction   4. Methods

   (A) 1, 2, 3, 4

   (B) 1, 2, 4, 3

   (C) 4, 2, 1, 3

   (D) 1, 3, 4, 2

9. Match the following:

List – I		List – II	
(Research Concept)		(Characteristics)	
a.	Hypothesis	1.	It is statistical test that does not make assumptions about the parameters
b.	Sample	2.	Device using which data are collected in research
c.	Research tool	3.	A subset drawn from a larger set to represent it
d.	Non parametric test	4.	A tentative statement indicating relationship between two or more variables

Choose the correct answer from the options given below:

(A)   a - 4, b - 3, c - 2, D – 1

(B)   a - 1, b - 2, c - 3, d – 4

(C)   a - 2, b - 1, c - 4, d – 3

(D)   a - 3, b - 4, c - 1, 4 – 2

10. Which one of the following is not a type of hypothesis

(A)   Null hypothesis

(B)   Prediction hypothesis

(C)   Alternative hypothesis

(D)   Directional hypothesis

11. The process of selecting a subset of a population for a survey is known as

(A)   Survey research

(B)   Representation

(C)   Triangulation

(D)   Sampling

12. ICT stands for

(A)   Information and communication technology

(B)   Information-controlled technology

(C)   Information-capable technology

(D)   None of the above

13. A man's monthly income is 1400. What should be his average monthly expenditure so that he is able to save 3600 Rs. in a year?

(A)   1000

(B)   1100

(C)   1150

(D)   1200

14. If 'LIGHT' is coded as 'GILTH', then find the code for 'RAINY'

(A)   IARYN

(B)   ARINY

(C)   NAIRY

(D)   RINAY

15. Scopus is a

(A)   Full text database

(B)   Numerical database

(C)   Abstract and Citation database

(D)   None of the Above

Directions 16-20: Study the following table carefully and answer questions 16-20. It consists of data on the graduates and postgraduates living in various towns.

Towns	Graduates	Postgraduates
A	10,200	8000
B	25,250	18,000
C	15,150	10,500
D	20,200	16,250
E	24,000	20,000
F	16,500	18,450

16. What is the difference between the number of graduates and the number of postgraduates in town C?

(A) 4500

(B) 4600

(C) 4650

(D) 4560

17. What is the average number of postgraduates in all the towns together?

(A) 15, 000

(B) 15, 500

(C) 16, 250

(D) 15, 200

18. What is the ratio of the number of graduates from towns A and B together to the number of postgraduates from towns A and E together?

(A) 709 : 580

(B) 709 : 560

(C) 560 : 709

(D) None of the above

19. What is the total number of graduates and postgraduates in towns A, D and F together?

(A) 85, 500

(B) 88, 600

(C) 89, 600

(D) 90, 600

20. The number of graduates in town F is approximately what percentage of the number of postgraduates in the same town?

(A) 84

(B) 89

(C) 92

(D) 95

21. The noise variance for AWGN is

(A) N0/2

(B) N0

(C) N0/4

(D) 2N0

22. In the case of CDMA, _____ frequency reuse is totally possible

(A) 90%

(B) 100%

(C) 50%

(D) No

23. _____ is the unit of average mutual information

(A) Bytes per symbol

(B) Bits per symbol

(C) Bytes

(D) Bits

24. Which of the following is a type of wireless communication

(A) LAN

(B) WAN

(C) PAN

(D) None of the above

25. Which of the following leads to the 3G evolution of GSM, IS-136, and PDC systems
   (A) GPRS
   (B) HSCSD
   (C) W-CDMA
   (D) EDGE

26. Which of the following is a universally adopted shape of the cell
   (A) Hexagon
   (B) Square
   (C) Circle
   (D) Triangle

27. Which of the following is a type of digital logic circuit

   (A) Combinational logic circuits
   (B) Sequential logic circuits
   (C) Both Combinational & Sequential logic circuits
   (D) None of the above

28. Which characteristic of IC in Digital Circuits represents a function of the switching time of a particular transistor
   (A) Fan – out
   (B) Fan – in
   (C) Power dissipation
   (D) Propagation delay

29. What must be used along with synchronous control inputs to trigger a change in the flip flop
   (A) 0
   (B) 1
   (C) Clock
   (D) Previous output

30. What is the minimum distance required for single error detection according to Hamming's analysis in Digital Electronics
   (A) 1
   (B) 2
   (C) 3
   (D) 4

31. Which of the following file extension that is loaded in a microcontroller for executing any instruction
   (A) .c
   (B) .txt
   (C) .hex
   (D) .doc

32. Which of the following architecture is followed by general-purpose microprocessors
   (A) Von Neumann architecture
   (B) Harvard architecture
   (C) None of the mentioned
   (D) All of the mentioned

33. Which of the following condition is true for cut-off mode
   (A) The collector current is zero
   (B) The collector current is proportional to the base current
   (C) The base current is non zero
   (D) All of the above

34. Which of the following is true for a npn transistor in the saturation region
    (A) The potential difference between the collector and the base is approximately 0.2V
    (B) The potential difference between the collector and the base is approximately 0.3V
    (C) The potential difference between the collector and the base is approximately 0.4V
    (D) The potential difference between the collector and the base is approximately 0.5V

35. If a MOSFET is to be used in the making of an amplifier then it must work in
    (A) Cut-off region
    (B) Triode region
    (C) Saturation region
    (D) Both cut-off and triode region can be used

36. A silicon semiconductor diode when subjected to ohmmeter testing gives low resistance in both directions. Which of the following is the correct inference to be drawn
    (A) Diode is faulty
    (B) Power failure to the Ohmmeter
    (C) Diode is short-circuited
    (D) Diode is open-circuited

37. Which material is generally used for the manufacture of Zener diode
    (A) Silicon
    (B) Germanium
    (C) Mercury
    (D) Arsenic

38. Which of the following is not an advantage of using a LED
    (A) High response time
    (B) Compatibility with solid-state circuits
    (C) Rugged construction and high lifetime
    (D) No need for a heat sink in long run

39. Which of the following devices forwards packets between networks by processing the routing information included in the packet
    (A) Firewall
    (B) Bridge
    (C) Hub
    (D) Router

40. Which layer does the data link layer take packets from and encapsulate them into frames for transmission
    (A) Transport layer
    (B) Application layer
    (C) Network layer
    (D) Physical layer

41. Which topology requires a multipoint connection
    (A) Ring
    (B) Bus
    (C) Star
    (D) Mesh

42. Which of the following are Gigabit Ethernets
    (A) 1000 BASE-LX
    (B) 1000 BASE-CX
    (C) 1000 BASE-SX
    (D) All of the above