# PAPER-II
# ELECTRONIC SCIENCE

**Signature and Name of Invigilator**

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

OMR Sheet No. : .....
(To be filled by the Candidate)

Roll No. | | | | | | | | |
(In figures as per admission card)

Roll No._____
(In words)

**J 8 8 1 4**

Time : **1 $^1/_4$** hours] [Maximum Marks : **100**

Number of Pages in this Booklet : **12**

Number of Questions in this Booklet : **50**

## Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of fifty multiple-choice type of questions.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the 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 booklet without sticker-seal and do not accept an open booklet.
   (ii) **Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, 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 on this Test 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 :** (A) (B) ● (D)
   where (C) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Sheet given inside the Paper I Booklet only.** If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. You have to return the test question booklet and Original OMR Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry original question booklet and duplicate copy of OMR Sheet on conclusion of examination.
10. **Use only Blue/Black Ball point pen.**
11. **Use of any calculator or log table etc., is prohibited.**
12. **There is no negative marks for incorrect answers.**

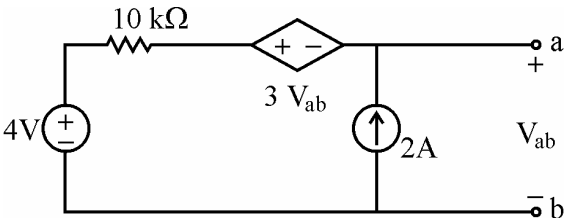
## परीक्षार्थियों के लिए निर्देश

1. इस पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
2. इस प्रश्न-पत्र में पचास बहुविकल्पीय प्रश्न हैं ।
3. परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी । पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे, जिसकी जाँच आपको अवश्य करनी है :
   (i) प्रश्न-पुस्तिका खोलने के लिए उसके कवर पेज पर लगी कागज की सील को फाड़ लें । खुली हुई या बिना स्टीकर-सील की पुस्तिका स्वीकार न करें ।
   (ii) **कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चैक कर लें कि ये पूरे हैं । दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें । इसके लिए आपको पाँच मिनट दिये जायेंगे । उसके बाद न तो आपकी प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा ।**
   (iii) इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
4. प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (A), (B), (C) तथा (D) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है ।
   **उदाहरण** : (A) (B) ● (D)
   जबकि (C) सही उत्तर है ।
5. प्रश्नों के उत्तर **केवल प्रश्न पत्र I के अन्दर दिये गये OMR पत्रक पर ही** अंकित करने हैं । यदि आप OMR पत्रक पर दिये गये वृत्त के अलावा किसी अन्य स्थान पर उत्तर चिह्नांकित करते हैं, तो उसका मूल्यांकन नहीं होगा ।
6. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें ।
7. कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें ।
8. यदि आप OMR पत्रक पर नियत स्थान के अलावा अपना नाम, रोल नम्बर, फोन नम्बर या कोई भी ऐसा चिह्न जिससे आपकी पहचान हो सके, अंकित करते हैं अथवा अभद्र भाषा का प्रयोग करते हैं, या कोई अन्य अनुचित साधन का प्रयोग करते हैं, जैसे कि अंकित किये गये उत्तर को मिटाना या सफेद स्याही से बदलना तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
9. आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें । हालांकि आप परीक्षा समाप्ति पर मूल प्रश्न-पुस्तिका तथा OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
10. **केवल नीले/काले बाल प्वाईंट पेन का ही इस्तेमाल करें ।**
11. **किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है ।**
12. **गलत उत्तरों के लिए कोई नकारात्मक अंक नहीं हैं ।**

## ELECTRONIC SCIENCE
## Paper – II

**Note :** This paper contains **fifty (50)** objective type questions of **two (2)** marks each. **All** questions are compulsory.

**1.** For the circuit shown in figure, the terminal voltage $V_{ab}$ is given by :




(A) 5 V (B) 6 V
(C) 2.5 V (D) 3 V

**2.** The earth has a conductivity of $10^{-2}$ mho/m, $\in_r = 10$, $\mu_r = 2$, f = 10 GHz, the earth behaves like a

(A) Good conductor
(B) Moderate conductor
(C) Good dielectric
(D) Bad dielectric

**3.** The carrier velocity in a silicon p-i-n photodiode with 25 μm depletion layer width is $3 \times 10^4$ m/s. The maximum response time for the pin diode is given by :

(A) 52 ns (B) 2.5 ns
(C) 62 ns (D) 5.2 ns

**4.** For a JFET, above the pinch-off voltage, as the drain voltage increases, the

(A) the drain current remains constant.
(B) the drain current decreases.
(C) the drain current increases linearly.
(D) the drain current varies parabolically.

**5.** What bandwidth is needed for an FM signal that has a peak deviation of ± 3 KHz and handles audio signals from 200 Hz to 5 KHz ?

(A) 6 KHz
(B) 16 KHz
(C) 10 KHz
(D) 9.6 KHz

**6.** In which of the following base system, 132 is not a valid number ?

(A) Base 16 (B) Base 10
(C) Base 8 (D) Base 2

**7.** What is the relation between k and T such that a unity feedback control system whose open loop transfer function below is stable :

$$G(s) = \frac{k}{s[s(s + 10) + T]}$$

(A) $0 < k < 10T$
(B) $0 > k > 10T$
(C) $0 < k < T$
(D) $0 < k > T$

**8.** Microprocessor development had happened because of LSI. What is LSI ?

(A) Large Scale Integral
(B) Large Signal Integration
(C) Large Scale Integration
(D) Long Signal Integration

**9.** 'Stdio.h' header file contains functions related to

(A) prototypes for the standard input/output library functions.

(B) prototypes for the standard input and standard output functions.

(C) prototypes for the functions that perform input from files.

(D) prototypes for functions that perform input from strings in memory and outputs to strings in memory.

**10.** The threshold voltage of a MOSFET can be lowered by

1. using a thinner gate oxide
2. reducing the carrier concentration in the substrate
3. increasing the carrier concentration in the substrate

Of these statements :

(A) 3 alone is correct.

(B) 1 and 2 are correct

(C) 1 and 3 are correct

(D) 2 alone is correct

**11.** An angular position to be measured using a transducer. Which of the following types of transducers can be used for this purpose ?

1. Circular potentiometer
2. LVDT
3. E-pick off
4. Synchro

Select the correct answer using the codes given below :

**Codes :**

(A) 1, 2, 3 and 4

(B) 2 and 3

(C) 1, 2 and 4

(D) 1 and 4

**12.** In a hybrid TEE (Magic T), following statements are given :

1. $S_{11}$, $S_{22}$, $S_{33}$ and $S_{44}$ are non-zero.
2. All junctions are reciprocal i.e. $S_{jk} = S_{kj}$
3. $S_{11}$, $S_{22}$, $S_{33}$ and $S_{44}$ are zero.
4. $S_{13} = -S_{23}$, $S_{14} = S_{24}$, $S_{43} = 0$ and $S_{34} = 0$

Which one of the following is true ?

(A) 1, 2 and 4 are correct.

(B) 1 and 2 are correct.

(C) 2, 3 and 4 are correct.

(D) 1, 2 and 3 are correct.

**13.** In optical fibers, following statements are given :

1. 1550 nm is zero dispersion wavelength
2. 1330 nm is zero dispersion wavelength
3. At 1330 nm, attenuation is minimum
4. At 1550 nm, attenuation is minimum

Which one of the following is correct ?

(A) 1 and 4 are true.

(B) 1 and 3 are true.

(C) 2 and 4 are true.

(D) 1, 2 and 3 are true.

**14.** Which of the following techniques are used to generate frequency modulated signal :

1. Armstrong
2. Foster-Sealy Discriminator
3. Balanced Modulator
4. Reactance Modulator

Which one of the following is true ?

(A) 1 and 2

(B) 1, 2 and 3

(C) 1 and 3

(D) 1 and 4

**15.** Which of the following statements are true regarding the operation of JK flip-flop ?

1. When K input is low and J input is high, the Q output of the flip flop is reset.
2. When K input is high and J input is low, the output Q of the flip flop is set.
3. When both the inputs K and J are low, the output Q does not change.
4. When both the inputs K and J are high it is possible to set or reset the flip-flop (ie) the output toggle on next positive clock edge.

Which one of the following is true ?

(A) 1 and 2

(B) 3 and 4

(C) 1, 2 and 3

(D) All of the above

**16.** A linear two-terminal network can be replaced by an equivalent circuit consisting of a current source in parallel with resistor $R_N$, where $R_N$ is the ratio of

1. Closed circuit voltage to short circuit current at the terminal pair.
2. Open circuit voltage to open circuit current at the terminal pair.
3. Open circuit voltage to short circuit current at the terminal pair.
4. Closed circuit voltage to open circuit current at the terminal pair.

(A) 1 and 4

(B) only 2

(C) 3 only

(D) only 3 and 4

**17.** The following signals of microprocessors are intercepts :

1. TRAP
2. $\overline{\text{INTA}}$
3. IO/$\overline{\text{M}}$
4. $\overline{\text{RESET IN}}$

(A) 1 and 3

(B) 1 and 4

(C) 2 and 3

(D) 3 and 4

**18.** C programming language can be considered as

1. Low level programming
2. High level programming
3. Assembly level programming
4. Machine level programming

(A) 1 and 4 (B) 2 and 3

(C) 1 and 2 (D) 3 and 4

**19.** A linear two terminal circuit can be replaced by an equivalent circuit consisting of a voltage source $V_t$ in series with a resistor $R_t$ where $R_t$ is the ratio of

1. open circuit voltage to the short circuit current at the terminal pair.
2. short circuit current to the short circuit voltage at the terminal.
3. Open circuit voltage to the open circuit current at the terminal pair.
4. the independent sources are turned off.

(A) 1 and 4 (B) 2 and 4

(C) 3 and 4 (D) 2 and 3

**20.** Semi conductors have

(A) Positive temperature coefficient of resistance

(B) Zero temperature coefficient of resistance

(C) Negative temperature coefficient of resistance

(D) Resistance does not change with temperature

**21.** Consider the following Excimer Lasers used for photolithography and surgery purposes :

1. $Ar_2$ Excimer laser
2. ArF Excimer laser
3. XeC*l* Excimer laser
4. XeF Excimer laser

The correct sequence of the descending order of wavelength of operation is

(A) 2, 3, 1, 4 (B) 1, 2, 3, 4

(C) 1, 3, 2, 4 (D) 4, 3, 2, 1

**22.** Arrange the following communication systems in increasing order of their available commercial bandwidth :

1. Satellite Communication System
2. Amplitude Modulated System
3. Frequency Modulated System
4. Two-line transmission system

Correct sequence is

(A) 4, 2, 3, 1 (B) 1, 2, 3, 4

(C) 4, 3, 2, 1 (D) 1, 3, 2, 4

**23.** Priority of the interrupts in the order from the highest to least priority

1. RST 7.5
2. RST 5.5
3. $\overline{\text{RESET IN}}$
4. RST 6.5

The correct sequence is

(A) 1, 4, 2 and 3

(B) 3, 1, 4 and 2

(C) 2, 4, 1 and 3

(D) 3, 2, 4 and 1

**24.** Sequence of operators according to the priority

1. '/' 2. '+'
3. '*' 4. '–'

The correct sequence is

(A) 1, 2, 3 and 4
(B) 2, 3, 4 and 1
(C) 3, 4, 1 and 2
(D) 3, 1, 2 and 4

**25.** What is the correct sequence of the following step in the fabrication of a monolithic, bipolar junction transistor ?

1. Emitter diffusion
2. Base diffusion
3. Buried layer formation
4. Epi-layer formation

Select the correct sequence using the codes given below :

(A) 3, 4, 1, 2 (B) 4, 3, 1, 2
(C) 3, 4, 2, 1 (D) 4, 3, 2, 1

**26.** Match List – I with List – II and select the correct answer using codes given below :

| | **List – I** | | **List – II** |
|---|---|---|---|
| a. | $\nabla \times \bar{H}$ | i. | $\rho_v$ |
| b. | $\nabla \cdot \bar{D}$ | ii. | $-\frac{\partial B}{\partial t}$ |
| c. | $\nabla \times \bar{E}$ | iii. | $\bar{J} + \frac{\partial \bar{D}}{\partial t}$ |
| d. | $\nabla \cdot (\nabla \times \bar{B})$ | iv. | 0 |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | iv | i | ii | iii |
| (B) | iii | i | ii | iv |
| (C) | iii | ii | i | iv |
| (D) | i | ii | iii | iv |

**27.**

| | **List – I** | | **List – II** |
|---|---|---|---|
| a. | Multiplexer | i. | Selects one of many inputs to a single output |
| b. | Flip-Flop | ii. | Combinational circuit |
| c. | Shift Register | iii. | Memory |
| d. | Parallel Adder | iv. | Sequential logic |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | i | iii | iv | ii |
| (B) | i | iv | ii | iii |
| (C) | i | ii | iv | iii |
| (D) | i | iii | ii | iv |

**28.**

| | **List – I** | | **List – II** |
|---|---|---|---|
| a. | Shot Noise | i. | Resistance |
| b. | Johnson Noise | ii. | Diode |
| c. | Current Noise | iii. | P-N junction |
| d. | Partition Noise | iv. | Triode |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | i | ii | iv | iii |
| (B) | iii | iv | i | ii |
| (C) | iv | i | ii | iii |
| (D) | ii | i | iii | iv |

**29.**

| List – I | List – II |
|---|---|
| a. 1550 nm | i. 100 GHz |
| b. 0.8 nm | ii. Visible light |
| c. 400-700 nm | iii. Ultra violet |
| d. 200 nm | iv. 193 T Hz |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | iv | i | ii | iii |
| (B) | iv | ii | i | iii |
| (C) | i | ii | iii | iv |
| (D) | iv | iii | i | ii |

**30.**

| List – I (Structure/ Characteristics) | List – II (Reasons) |
|---|---|
| a. n-channel JFET is better than p-channel JFET | i. Reverse bias increases along the channel |
| b. Channel is wedge shaped | ii. High electric field near the drain and directed towards source |
| c. Channel is not completely closed at pinch-off | iii. Low leakage current at the gate terminal |
| d. Input impedance is high | iv. Better frequency performance since $\mu_n >> \mu_p$ |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | iv | i | ii | iii |
| (B) | iv | ii | iii | i |
| (C) | iii | i | ii | iv |
| (D) | ii | iv | iii | i |

**31.**

| List – I | List – II |
|---|---|
| a. Flash converter | i. Integrating type |
| b. Successive approximation | ii. Fastest converter |
| c. Counter Ramp | iii. Maximum conversion Time = N bits |
| d. Dual Slope | iv. Uses a DAC in its feed-back path |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | ii | iii | iv | i |
| (B) | i | iii | iv | ii |
| (C) | ii | iv | iii | i |
| (D) | i | iv | iii | ii |

**32.**

| List – I (Devices) | List – II (Characteristics) |
|---|---|
| a. BJT | i. Voltage controlled negative resistance |
| b. MOSFET | ii. High current gain |
| c. Tunnel diode | iii. Voltage regulation |
| d. Zener diode | iv. High input impedance |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | ii | iv | i | iii |
| (B) | i | iv | ii | iii |
| (C) | ii | iii | i | iv |
| (D) | i | iii | ii | iv |

33.

| List – I | List – II |
|---|---|
| a. Gauss meter | i. Pressure measurement |
| b. Logic analyser | ii. Flow measurement |
| c. Pirani gauge | iii. Trouble shooting of digital electronic circuits |
| d. Rotameter | iv. Magnetic flux density |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | i | iv | iii | ii |
| (B) | ii | iii | i | iv |
| (C) | i | ii | iii | iv |
| (D) | iv | iii | i | ii |

34.

| List – I | List – II |
|---|---|
| a. AC | i. Contains the data of stored from registers |
| b. SP | ii. used for storing address of the external memory |
| c. HL | iii. Contains the address of the instructions which has to be executed after completion of execution of present instruction. |
| d. PC | iv. Primary register to perform arithmetic and logical operations |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | ii | iii | iv | i |
| (B) | iii | i | ii | iv |
| (C) | iv | i | ii | iii |
| (D) | ii | iv | iii | i |

35.

| List – I | List – II |
|---|---|
| a. Super position theorem | i. Ratio of excitation to response is constant when the positions of excitation and response are interchanged |
| b. Thevenin's theorem | ii. Applicable to linear systems |
| c. Reciprocity theorem | iii. Source represented by its Thevenin's equivalent circuits |
| d. Maximum power transfer theorem | iv. Reduce some portion of circuit to an equivalent source and a single element |

**Codes :**

| | a | b | c | d |
|---|---|---|---|---|
| (A) | iii | i | iv | ii |
| (B) | ii | iv | i | iii |
| (C) | iv | iii | i | ii |
| (D) | ii | i | iv | iii |

**Directions : Q. Nos. 36 to 45 :** The following items consists of two statements, one labelled the "Assertion (A)" and the other labelled the "Reason (R)". You are to examine these two statements carefully and decide if the Assertion (A) and Reason (R) are individually true and if so, whether the reason is a correct explanation of the Assertion. Select your answer to these items using the codes given below and mark your answer accordingly.

**Codes :**

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

**36.** **Assertion (A) :** Brewster angle is the angle of incidence at which there is no reflection.

**Reason (R) :** For parallel polarisation, Brewster angle is given by following expression :

$$\frac{E_r}{E_i} = \frac{\cos\theta_i + \sqrt{\left(\frac{\in r_2}{\in r_1}\right) - \sin^2\theta_i}}{\cos\theta_i - \sqrt{\left(\frac{\in r_2}{\in r_1}\right) + \sin^2\theta_i}}$$

**37.** **Assertion (A) :** An EDFA is usually pumped at 980 nm wavelength, which means that Erbium ions at ground level absorb energy.

**Reason (R) :** This absorbed energy is transferred to high frequency signals to boost up.

**38.** **Assertion (A) :** D-flip-flops are used as buffer register.

**Reason (R) :** Flip-flops are free from "race-around" condition.

**39.** **Assertion (A) :** Routh Hurwitz criterion gives both absolute as well as relative stability using characteristic equation.

**Reason (R) :** For a system to be stable all roots of characteristic equation must lie in left half of s-plane.

**40.** **Assertion (A) :** Considering two p-n-p and n-p-n transistors of identical construction as far as shape, size and doping are concerned, the n-p-n transistor will have a better frequency response.

**Reason (R) :** The electron mobility is higher than that of the hole mobility.

**41.** **Assertion (A) :** If a semiconductor is placed in a transverse magnetic field B and an electric field E is applied across its other two faces, then it would produce an electric current 'I' in the direction perpendicular to both B and E.

**Reason (R) :** Hall coefficient is proportional to the mobility of the charge carriers in the semi conductor.

**42.** **Assertion (A) :** A monostable multivibrator can be used to alter the pulse width of a repetitive pulse train.

**Reason (R) :** Monostable multivibrator has a single stable state.

**43.** **Assertion (A) :** In a two port network, with 4 terminals four types of parameters like impedance, admittance, hybrid and transmission are considered and they are related to each other.

**Reason (R) :** The assumption made for the above statement is that there are no independent sources and non-zero initial conditions within the linear port network.

**44.** **Assertion (A) :** MOV A, 08 H

It means the contents of memory address 08 H are moved to be contents of A.

**Reason (R) :** MV 1 A, 82 H

It means that the contents of memory address 82 H are moved to be contents of A immediately.

**45.** **Assertion (A) :** To avoid repetition of code and bulky programs functionally related statements are isolated into a function.

**Reason (R) :** Function definition defines the body of the function.

Read the passage and answer the questions **46** to **50** that follows based on your understanding of passage :

An antenna is generally a metallic object, often a wire or collection of wires, used to convert high frequency current into electromagnetic waves and vice-versa. Antenna serve either or both of the following two functions, generation or the collection of electromagnetic energy. In a transmitting system, a radio-frequency signal is developed, amplified, modulated and applied to the antenna. The R-F currents flowing through the antenna produce electromagnetic waves which radiate into the atmosphere. In a receiving system, electromagnetic waves "cutting" through the antenna induce alternating currents for use by the receiver.

Efficient operation also requires that the receiving antenna be of the same polarization as the transmitting antenna. Polarization is the direction of the electric field and is therefore, the same as the antennas physical configuration. Thus vertical antenna will transmit vertical polarized light, any antenna having a physical length that is one-half wavelength of the applied frequency is called a Hertz antenna. Hertz antenna are predominantly used with frequencies above 2 MHz. Usually, at frequencies below 2 MHz, a Marconi type of antenna is used. The Marconi antenna is usually a quarter-wave grounded antenna or any odd multiple of a quarter wavelength.

The Yagi-Uda antenna consists of a drivers element and two or more parasitic elements. Yagi-Uda has two parasitic elements, a reflector and a director. This Yagi-Uda antenna provides about 7 dB of power gain with respect to a half-wavelength dipole reference. More complex antennas may be circularly polarized both vertically and horizontally polarized waves are radiated with equal power in both. If the powers are unequal the antenna is said to be elliptically polarized.

A horn is an ideal antenna for terminating a waveguide and may be conical, rectangular or sectorial. Wide band antennas either when the transmissions are wide band or when working of narrow channels over a wide frequency range is the major application. Helical antenna, which consists of a loosely wound helix backed up by a metal ground plane. Loop antennas are often used for direction finding. Loops have many shapes and generally consists of a single turn of wire. Discone is a ground plane antenna evolved from the vertical dipole and having a very similar radiation pattern.

**46.** A helical antenna is used for satellite tracking because of its

(A) circular polarization

(B) elliptical polarization

(C) broad band width

(D) good front-to-back ratio

**47.** The discone antenna is

(A) a useful direction finding antenna

(B) used as a radar receiving antenna

(C) circularly polarized like other circular antennas

(D) useful as a UHF receiving antenna

**48.** Which of the following antennas is best exerted from a waveguide ?

(A) Biconical

(B) Folded dipole

(C) Horn

(D) Discone

**49.** Which is a non-resonant antenna ?

(A) Marconi

(B) Rhombic

(C) Yagi-Uda

(D) Discone

**50.** An antenna is polarized in the plane of the field perpendicular to

(A) Electric field

(B) Magnetic field

(C) Both Electric and Magnetic field

(D) Field parallel to both electric and magnetic field

**Space For Rough Work**