PAPER-III
ELECTRONIC SCIENCE

Signature and Name of Invigilator

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

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Time : 2 ¹/₂ hours]

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

OMR Sheet No. : ....

(To be filled by the Candidate)

Roll No. [ ][ ][ ][ ][ ][ ][ ][ ]

(In figures as per admission card)

Roll No._____

(In words)

[Maximum Marks : **150**

Number of Questions in this Booklet : **75**

Instructions for the Candidates	**परीक्षार्थियों के लिए निर्देश**
1. Write your roll number in the space provided on the top of this page.	1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
2. This paper consists of seventy five multiple-choice type of questions.	2. इस प्रश्न-पत्र में पचहत्तर बहुविकल्पीय प्रश्न हैं ।
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 :	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) To have access to the Question Booklet, tear off the paper seal / polythene bag on the booklet. Do not accept a booklet without sticker-seal / without polythene bag and do not accept an open booklet.	(i) प्रश्न-पुस्तिका खोलने के लिए पुस्तिका पर लगी कागज की सील / पोलिथीन बैग को फाड़ लें । खुली हुई या बिना स्टीकर-सील / बिना पोलिथीन बैग की पुस्तिका स्वीकार न करें ।
(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.**	(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) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.	(iii) इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
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.	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 ।
Example : (A) (B) ● (D) where (C) is the correct response.	उदाहरण : (A) (B) ● (D) जबकि (C) सही उत्तर है ।
5. Your responses to the items are to be indicated in the **OMR Sheet given inside the Booklet only.** If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.	5. प्रश्नों के उत्तर **केवल प्रश्न पुस्तिका 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. Read instructions given inside carefully.	6. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें ।
7. Rough Work is to be done in the end of this booklet.	7. कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें ।
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, you will render yourself liable to disqualification.	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, तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
9. You have to return the 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 duplicate copy of OMR Sheet on conclusion of examination.	9. आपको परीक्षा समाप्त होने पर 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 OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
10. Use only Blue/Black Ball point pen.	10. केवल नीले/काले बाल प्वाईंट पेन का ही इस्तेमाल करें ।
11. Use of any calculator or log table etc., is prohibited.	11. किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है ।
12. There is no negative marks for incorrect answers.	12. गलत उत्तरों के लिए कोई अंक काटे नहीं जाएँगे ।

ELECTRONIC SCIENCE
Paper – III

Note : This paper contains **seventy five (75)** objective type questions of **two (2)** marks each.
All questions are compulsory.

1. In UJT, the value of stand-off ratio is

(A) 0.2 (B) 0.4

(C) 0.7 (D) 0.98

2. Tunnel diode is basically a junction diode with

(A) High doping in P-region alone

(B) High doping in p and n regions, both

(C) High doping in n region alone

(D) Low doping in both P and n regions

3. The condition for a two-port network to be reciprocal is

(A) $Z_{11} = Z_{22}$ (B) $Y_{21} = Y_{22}$

(C) $h_{21} = h_{12}$ (D) $h_{21} = -h_{12}$

4. An Op-Amp behaves like an ideal Op-Amp upto

(A) Hz (B) 5 KHz

(C) 5 MHz (D) 50 MHz

5. If the gain of an ideal amplifier decreases, the bandwidth

(A) increases

(B) decreases

(C) remains zero

(D) remains unaltered

6. To use as a memory, which one of the following is more suitable ?

(A) Monostable multivibrator

(B) Bistable multivibrator

(C) Astable multivibrator

(D) Schmitt trigger

7. NAND gate is also called as

(A) Bubbled AND gate

(B) Bubbled OR gate

(C) Bubbled NOR gate

(D) Bubbled XOR gate

8. The INTR pin in 8086 is a

(A) Non-maskable interrupt

(B) Maskable interrupt

(C) Priority interrupt

(D) None of the above

9. 8085 microprocessor does not have

(A) Zero flag

(B) Sign flag

(C) Parity flag

(D) Overflow flag

10. Which mode of 8253 acts as a square wave generator ?

(A) Mode-1

(B) Mode-2

(C) Mode-4

(D) Mode-3

11. Which of the following program is not a utility ?

(A) Debugger

(B) Spool

(C) Editor

(D) Inhibit

12. Modulation is a process of

(A) Reducing distortions

(B) Improving thermal stability

(C) Combining audio and radio frequency waves at the transmitter

(D) Generating constant frequency waves

13. Which type of modulation causes envelope distortion of a base band signal ?

(A) Amplitude modulation

(B) Frequency modulation

(C) Phase modulation

(D) Angle modulation

14. Poynting vector for an EM wave is

(A) $\overline{H} \cdot \overline{E}$ (B) $\overline{H} \, \overline{E}$

(C) $\overline{E} \times \overline{H}$ (D) $\nabla \times \overline{E} \times \overline{H}$

15. When microwave signals flow through the curvature of the earth, it is called

(A) Duct position

(B) Faraday's effect

(C) Raman scattering

(D) Ionospheric scattering

16. The Reflex Klystron can be used as

(A) Amplifier only

(B) Oscillator only

(C) Both amplifier and oscillator

(D) Neither amplifier nor oscillator

17. Step down regulator produces an output

(A) low voltage and low current

(B) low voltage at high current

(C) high voltage at low current

(D) high voltage at high current

18. The time base of a CRO is controlled by

(A) Square waveform

(B) Sine waveform

(C) Saw tooth waveform

(D) Staircase waveform

19. Routh Hurwitz criterion gives

(A) Phase-details

(B) Marginal stability

(C) Relative stability

(D) Absolute stability

20. Photo diode is reverse biased because

(A) only one side is illuminated

(B) majority carriers flow under these conditions.

(C) reverse current is small as compared to photo current

(D) reverse current is large as compared to photo current

21. For PCM, the bandwidth required to transmit a voice channel is

(A) 20 KHz   (B) 5 KHz

(C) 64 MHz   (D) 64 KHz

22. In SCR's snubber circuits employ

(A) Inductor only

(B) A combination of R and L

(C) A combination of R and C

(D) Resistance only

23. In optical fiber communication systems, FBG is used for

(A) Dispersion compensation

(B) Long haul communication

(C) Non-linearity management

(D) Source

24. In an SCR, dual converter circuit

(A) $\alpha_1 + \alpha_2 = 90°$

(B) $\alpha_1 + \alpha_2 = 180°$

(C) $\alpha_1 + \alpha_2 = 270°$

(D) $\alpha_1 + \alpha_2 = 135°$

25. In the given circuit, power delivered to resistor R is
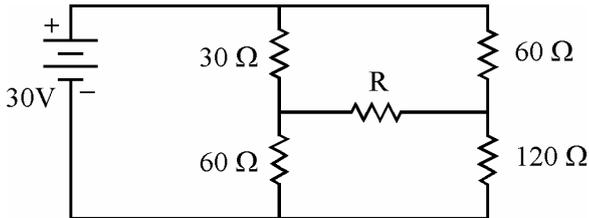
(A) −15 W

(B) 15 W

(C) 0 W

(D) unless 'R' is known, cannot determined

26. The Laplace transform of $\sin^2 3t$ is given by

(A) $\dfrac{18}{s(s^2 + 36)}$

(B) $\dfrac{6}{(s^2 + 36)}$

(C) $\dfrac{18(s + 6)}{s(s^2 + 36)}$

(D) $\dfrac{1}{6s(s^2 + 36)}$

27. The Fourier Transform of a Gaussian time pulse is

(A) Uniform

(B) A pair of impulse

(C) Gaussian

(D) Rayleigh

28. For the Z-transform $X(z) = 4z^2 + 2 + 3z^{-1}$, $0 < |z| < \infty$ $x(n)$ is given by

(A) $x(n) = 4\delta[n - 2] + 2\delta[n] + 3\delta[(n + 1)]$

(B) $x(n) = 4\delta[n + 2] + 2 + 3\delta[n - 1]$

(C) $x(n) = 4\delta[n + 2] + 2\delta[n] + 3\delta[n + 1]$

(D) $x(n) = 4\delta[n - 2] + 2\delta[n - 1] + 3$

29. An amplifier has an open loop gain of 100 and its lower and upper hand frequency of 100 Hz and 100 KHz, respectively. A feedback network with a feedback factor of 0.99 is connected to the amplifier, the new lower and upper cut off frequencies are at

(A) $f_H = 10$ MHz and $f_L = 1$ Hz

(B) $f_H = 25$ MHz and $f_L = 10$ Hz

(C) $f_H = 100$ MHz and $f_L = 100$ Hz

(D) $f_H = 10$ MHz and $f_L = 10$ Hz

30. How many flip-flops are required to build a digital counter to count from 0 to 1024 ?

(A) 11   (B) 6

(C) 10   (D) 24

31. Negative feedback in amplifier results in

(i) Reduced voltage gain

(ii) Reduced sensitivity

(iii) Decreased bandwidth

(iv) Reduced distortion

Of these statements :

(A) (i) and (ii) are correct

(B) (i), (ii) and (iii) are correct

(C) (i), (ii) and (iv) are correct

(D) (i) and (iv) are correct

32. Consider the following statements :

1. Figure of merit and CMRR are the same parameters.
2. In an Op-Amp CMRR is very high approaching to infinity.
3. The input stage of an Op-Amp is usually a differential amplifier

(A) 1, 2, 3 are correct
(B) 2 and 3 are correct
(C) 1 and 2 are correct
(D) 1 and 3 are correct

33. Consider the following statements with respect to ECL gates :

(i) ECL represents nonsaturated logic
(ii) ECL circuits are easy to interconnect with circuits of other families.
(iii) ECL family employs differential amplifier circuitry.
(iv) ECL has the unique feature of providing two outputs which are complementary to each other.

Among the above, which statements are correct ?

(A) (i), (ii) & (iii)   (B) (ii), (iii) & (iv)
(C) (ii), (iv) & (i)   (D) (i), (iii) & (iv)

34. A multiplexer :

(i) Selects one of the several inputs and transmits to a single output.
(ii) Routes the data from a single input to one of many outputs.
(iii) Converts parallel data into serial data.
(iv) It is a combinational circuit.

Which one of the following is correct ?

(A) (i), (ii) & (iv)
(B) (ii), (iii) & (iv)
(C) (i), (iii) & (iv)
(D) (i), (ii) & (iii)

35. Audio signals are not transmitted by EM waves because

(i) Antennas used will be unimaginably lengthy
(ii) Audio signals do not radiate
(iii) Interference is due to simultaneous transmissions.
(iv) Usable frequency range is too low and narrow.

Which of the following is correct ?

(A) (i) & (ii)   (B) (ii) & (iii)
(C) (i) & (iii)   (D) (i), (iii) & (iv)

36. Consider the statements :

(i) Waveguide acts as a high pass filter.
(ii) Coaxial cables are used to excite the waveguides.
(iii) TEM mode exists as dominant mode
(iv) Propagation constant is given by

$$\sqrt{\left(\frac{m\pi}{a}\right)^2 + \left(\frac{n\pi}{b}\right)^2 + w^2\,\mu\in}$$

Which of these is correct ?

(A) (i) & (ii)   (B) (ii) & (iii)
(C) (iii) & (iv)   (D) (i), (ii) & (iv)

37. Consider the following statements :

(i) LCD essentially acts as a capacitor.
(ii) LCD has slow decay time.
(iii) LCD's appear invisible in darkness.
(iv) Twisted nematic LCD segment appears black when its is in 'ON' condition.

Which is valid one ?

(A) Statements (i) and (ii)
(B) Statements (ii) and (iii)
(C) Statements (ii), (iii) and (iv)
(D) Statements (i), (ii), (iii) and (iv)

38. Consider the following statements :

(i) $\nabla \times \bar{E} = -\dfrac{\partial \bar{B}}{\partial t}$

(ii) $\bar{E}t_1 = \bar{E}t_2, \bar{D}n_1 = \bar{D}n_2$

(iii) $\nabla \times \nabla \times C = \nabla(\nabla \cdot C) + \nabla^2 C$

(iv) $\nabla \times \nabla V \neq 0$

Which is valid one ?

(A) All are correct

(B) (i) and (ii) are correct

(C) (i), (ii) and (iii) are correct

(D) (i), (ii) and (iv) are correct

39. Consider the following statements :

(i) Rayleigh Scattering losses are proportional to $\dfrac{1}{(\lambda)^4}$

(ii) The operating frequency of optical fiber is 193 T Hz

(iii) In III transmission windows, the attenuation is 5 dB/km.

Which one is correct ?

(A) (i) and (ii)

(B) (ii) and (iii)

(C) (i) and (iii)

(D) (i), (ii) and (iii)

40. Consider the following statements in connection with Electrodynamometer type instruments :

(i) They serve as transfer instrument.

(ii) They exhibit square law response.

(iii) They are free from hysteresis.

(iv) They have eddy current damping.

Which are valid ?

(A) (i), (ii), (iv)

(B) (i), (ii), (iii)

(C) (ii), (iii), (iv)

(D) (i), (ii), (iii), (iv)

Assertion-Reason type questions :

Q. 41 to 50 :

The following items consist of two statements, one labelled as 'Assertion (A)' and the other labelled the 'Reason (R)'. You are to examine these two statements and decide if the Assertion (A) and the Reason (R) are individually true and if so, whether the Reason is a correct explanation of the Assertion. Select your answers to these items using the codes given below and mark your answer sheet 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 the correct explanation of (A).

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

(D) (A) is false and (R) is true.

41. Assertion (A) : A step graded junction is formed when there is an abrupt change from acceptor ion on one side to donor ions on the other side.

Reason (R) : In step graded junctions, donor and acceptor concentrations are unequal and these junctions behave as asymmetrical junctions.

42. Assertion (A) : For a positive real function, N(s) must not have any poles in the right half plane.

Reason (R) : Re [N(jw)] ≤ 0 for all w

43. Assertion (A) : In common collector amplifier, voltage gain is greater than unity and this configuration is called as Emitter follower.

Reason (R) : Common collector stage is used for impedance matching as its input impedance is very large as compared to output impedance.

**44.** **Assertion (A) :** The TTL 54/74 ALS family has smallest delay power product.

Reason (R)   : Power consumption in TTL 54/74 ALS is reduced as there is decrease in resistance values and consequently current reduction.

45. **Assertion (A) :** The 'CALL' instruction is used to transfer program control to a subprogram or subroutine.

Reason (R)   : The instruction pushes the current programme counter contents on to the stack and loads the given address into the PC, and program control is transferred to the given address in the instruction.

46. **Assertion (A) :** Transmission lines are nothing but guided conducting structures which are used in power distribution at low frequencies, in communications and computer networks at higher frequencies.

Reason (R)   : Equivalent circuit of the transmission line is
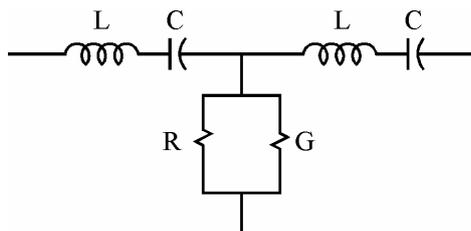
47. **Assertion (A) :** In quadrature detectors, the two signals are said to be in quadrature if they are at 45° angle.

Reason (R)   : Quadrature detectors are used to demodulate the FM signals.

48. **Assertion (A) :** Silicon controlled rectifiers are PNPN devices, having gate as controlling input.

Reason (R)   : These devices do not work on avalanche breakdown principle.

49. **Assertion (A) :** PIN diodes have wider depletion region, in order to allow light to penetrate more deeply in the semiconductor material.

Reason (R)   : III-V semiconductor materials are used to fabricate in order to allow shorter wavelength in the region of 400-700 nm.

50. **Assertion (A) :** The 'DO-WHILE' statement is used less frequently than the while statement.

Reason (R)   : For most applications, it is more natural to test for continuation of a loop at the beginning rather than at the end of the loop.

51. Arrange the following in order of increasing wavelength of output wave :

1.   He-Ne laser

2.   Nd:YAG laser

3.   Laser diode operating in 3rd transmission window

The correct order is

(A)   3, 2, 1

(B)   2, 3, 1

(C)   1, 3, 2

(D)   1, 2, 3

52. Arrange the following in terms of increasing Delay Power Product :
1. TTL 74 AS
2. TTL 74 LS
3. CMOS-74 C
4. ECL 100 K

The correct sequence is

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

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

53. Arrange the following in terms of increasing frequency :
1. UHF   2. X-Band
3. Sky waves   4. X-rays

The correct sequence is

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

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

54. Arrange the following in decreasing order of length :
1. 1 mil
2. 1 nm
3. 1 picometer
4. 1 femtometer

The correct sequence is

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

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

55. There are following blocks :
1. Antenna and RF stage
2. Mixer with Local oscillator
3. Amplifier (class C)
4. IF amplifier
5. Detector

The correct sequence of receiver section is

(A) 1, 2, 3, 4, 5   (B) 5, 1, 2, 3, 4

(C) 1, 2, 4, 3, 5   (D) 1, 2, 4, 5, 3

56. In a telemetry system, the correct sequence of transmission system is given by :
1. Information
2. Sensor and signal conditioning
3. Quantisation
4. Encoding
5. Antenna

The correct sequence is

(A) 5, 1, 2, 3, 4   (B) 1, 2, 3, 4, 5

(C) 2, 3, 4, 5, 1   (D) 5, 4, 3, 2, 1

57. Arrange the following in order of increasing the input impedances :
1. BJT CE stage
2. BJT in CB stage
3. BJT in CC stage
4. CMOS

The correct sequence is given by

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

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

58. For finding the inverse of a z-transform :
1. Partial fraction expansion
2. Contour integration
3. Convolution
4. Power series expansion

Following is the correct sequence :

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

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

59. For measuring VSWR,
1. Microwave source
2. Detector amplifier
3. Meter
4. Slotted section
5. Variable attenuator

The correct sequence is

(A) 1, 5, 4, 2, 3   (B) 3, 2, 1, 5, 4

(C) 4, 1, 2, 3, 5   (D) 1, 2, 3, 4, 5

60. Arrange the following in order of increasing frequency :

1. L band
2. S band
3. C band
4. K band

The correct sequence is

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

61. Match the following lists :

List – I	List – II
a. Early effect	i. IC Fabrication
b. Masking	ii. JFET
c. Enhancement	iii. MOSFET
d. Pinch off	iv. Transistor

The correct match is

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

62. Match the following lists :

List – I	List – II
a. Zeroes & Poles	i. Linear elements
b. Ramp	ii. ABCD
c. Super position	iii. $\dfrac{1}{S^2}$
d. Transmission parameters	iv. Stability

The correct match is

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

63. Match the following lists :

List – I	List – II
a. Virtual ground	i. Time constant
b. $\dfrac{L}{R}$	ii. Q-factor
c. $\dfrac{WL}{R}$	iii. Op-Amp
d. Intrinsic stand-off ratio	iv. UJT

The correct match is

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

64. Match the following lists :

List – I	List – II
a. IC 7410	i. Hex Inverter
b. IC 7404	ii. Quad 2 input OR gate
c. IC 7432	iii. JK master slave flip flop
d. IC 7472	iv. Triple 3-input NAND gate

The correct match is

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

65. Match the following lists :

List – I	List – II
a. IC 8051	i. Stack
b. Non-maskable	ii. Implied addressing mode
c. PUSH	iii. TRAP
d. CMA	iv. Microcontroller

The correct match is

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

66. Match the following lists :

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

The correct match is given by

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

67. Match the following lists :

List – I		List – II
a.	Envelope detector	i.	TV transmission
b.	Foster Seley discriminator	ii.	Frequency modulation
c.	Varacter diode	iii.	FM detection
d.	Vestigial side band	iv.	AM demodulation

The correct match is given by

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

68. Match the following lists :

List – I		List – II
a.	Slip	i.	Relaxation oscillator
b.	SCR	ii.	Class-E chopper
c.	UJT	iii.	Two-transistor model
d.	dc drives	iv.	Induction motors

The correct match is

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

69. Match the following lists :

List – I		List – II
a.	Intermodal dispersion	i.	Lasers
b.	Chirp	ii.	SMF (Single Mode Fiber)
c.	Intra-modal dispersion	iii.	III-V group
d.	Direct band gap semi-conductors	iv.	MMF (Multimode Fiber)

The correct match is

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

70. Match the following lists :

List – I		List – II	
a.	LVDT	i.	Speed
b.	Techo-generators	ii.	Resistance
c.	Wheatstone Bridge	iii.	Displacement
d.	Bourdon tube	iv.	Pressure

The correct match is given by

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

Read the following paragraph and answer the questions **71** to **75** :

Gunn effect is instrumental in the generation of microwave oscillations in bulk semiconductor material. The effect was exhibited by gallium arenide. The effect is a bulk property of semiconductors. If a small dc voltage is placed across a thin slice of germanium arsanide a negative resistance will manifest itself under certain conditions. The voltage gradient across the slice is increase of about 3300 v/cm, oscillations will then occur at microwave frequencies if the slice is connected to a suitably tuned circuit. The Gunn effect is independent of total voltage or current and is not effected by magnetic field, it occurs in n-type of materials only.

The PIN diode consists of a narrow layer of p-type semiconductor separated from an equally narrow layer of n type material. In PIN diode silicon tend to be the main material. The PIN diode is used for microwave power switching, limiting and modulation.

71. The transferred-electron bulk effect occurs in

(A) germanium

(B) gallium arsanide

(C) silicon

(D) metal semiconductor junction

72. Indicate which of the following diodes does not use negative resistance in its operation :

(A) Backward

(B) Gunn

(C) IMPATT

(D) Tunnel

73. Response time of PIN diode is of the order of

(A) 0.1 ns

(B) 1 ns

(C) 10 ns

(D) 1 milli.sc

74. PIN diode is used as

(A) sine wave modulator

(B) triangular wave modulator

(C) square wave modulator

(D) low frequency rectifier

75. One of the following microwave diodes is suitable for very low-power oscillator only.

(A) Tunnel

(B) Avalanche

(C) Gunn

(D) IMPATT

Space For Rough Work