PAPER-III
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 : **2 ½** hours] [Maximum Marks : **150**

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

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

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of seventy five 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 : Ⓐ Ⓑ ● Ⓓ
   where (C) is the correct response.
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.
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 पचहत्तर 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 : Ⓐ Ⓑ ● Ⓓ
   जबकि (C) सही उत्तर है ।
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. 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 – III

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

1. A triangular pulse is given at the input of an integrator circuit, the output will be of the form
(A) Square wave
(B) Triangular wave
(C) Parabolic
(D) Impulse

2. In an RC phase shift oscillator the frequency of oscillation is given by
(A) $\frac{0.65}{RC}$ (B) $\frac{0.065}{RC}$
(C) $\frac{6.5}{RC}$ (D) $\frac{1}{2\pi RC}$

3. IC LM 380 is a
(A) Voltage regulator
(B) Rectifier
(C) Power audio amplifier
(D) Schmitt trigger

4. The directivity of an antenna is 30 and it operates at a frequency of 100 MHz. The value of maximum effective aperture is given by
(A) 2.148 m^2 (B) 21.48 m^2
(C) 214.8 m^2 (D) 0.2148 m^2

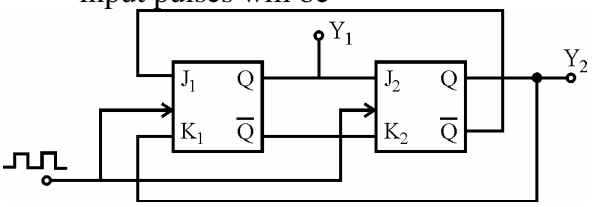
5. A coaxial cable has characteristic impedance of Z_0 = 75 Ω and a capacitance of 70 PF/m. The inductance of the coaxial per metre length is given by
(A) 3.937 μH/m (B) 39.37 μH/m
(C) 0.3937 μH/m (D) 393.7 μH/m

6. The value of radiation resistance of a Hertizian dipole of length $\frac{\lambda}{80}$ is given by
(A) 0.493 Ω (B) 0.219 Ω
(C) 12.3 Ω (D) 0.123 Ω

7. An LVDT has the following data : input = 6.3 V, Output = 5.2 V, range = ± 0.5 cm. The value of output voltage, when it is at 0.45 cm from the centre is given by
(A) 4.68 V (B) 0.468 V
(C) 4.68 mV (D) 46.8 mV

8. The Boolean expression $\bar{A}B + A\bar{B}C + \overline{(A + B + \bar{C})}$ simplifies to
(A) $A\bar{B} + \bar{B}C$ (B) $AB + BC$
(C) $A\bar{B} + B\bar{C}$ (D) $\bar{A}B + \bar{B}C$

9. In the circuit shown below, the output Y_1 and Y_2 for the given initial condition $Y_1 = Y_2 = 1$ and after four input pulses will be



(A) $Y_1 = 1, Y_2 = 1$
(B) $Y_1 = 1, Y_2 = 0$
(C) $Y_1 = 0, Y_2 = 1$
(D) $Y_1 = 0, Y_2 = 0$

10. Number of flip-flops needed to construct a shift register capable of storing decimal numbers upto 32 are
(A) 6 (B) 5
(C) 4 (D) 3

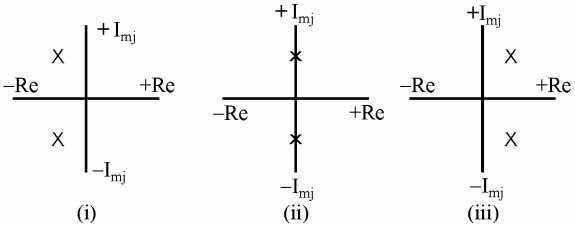
11. A carrier is frequency modulated with a sinusoidal signal of KHz resulting in a maximum frequency deviation of 5 KHz. Modulation index and bandwidth of the modulating signal is respectively is given as
(A) $m_f = 1$, BW = 10 KHz
(B) $m_f = 2$, BW = 12 KHz
(C) $m_f = 2.5$, BW = 14 KHz
(D) $m_f = 1.7$, BW = 14 KHz

12. Frequency in UHF range propagated by means of
(A) Ground wave
(B) Space wave
(C) Sky wave
(D) Surface wave

13. According to Hartley's law
(A) The maximum rate of information depends on the channel bandwidth
(B) The maximum rate of information depends on the depth of modulation
(C) Redundancy is essential
(D) Only binary codes can be used

14. The error detector element in a control system gives
(A) The sum of the reference signal and the feedback signal
(B) The sum of the reference signal and the error signal
(C) The difference of the reference signal and the feedback signal
(D) The difference of the reference signal and the output signal

15. From the location of the roots of S-plane, determine the stability of the system :



(A) (i) stable, (ii) unstable, (iii) sustained oscillation
(B) (i) stable, (ii) sustained oscillation (iii) unstable
(C) (i) unstable, (ii) stable (iii) sustained oscillation
(D) (i) sustained oscillation, (ii) unstable (iii) stable

16. The most important application of tunnel diode is
(A) as rectifier
(B) as switching device in digital circuits
(C) as voltage controlled device
(D) as oscillator

17. The value of Numerical Aperture in case of optical fiber is
(A) > 1 (B) < 1
(C) $= 1$ (D) $= 0$

18. The threshold voltage of an n-channel MOSFET can be increased by
(A) increasing the channel doping concentration
(B) reducing the channel doping concentration
(C) reducing the gate oxide thickness
(D) reducing the channel length

19. Which semi conductor device acts like a diode and two resistors ?
(A) Triac (B) SCR
(C) Diac (D) UJT

20. After firing an SCR, if the gate pulse is removed, the SCR current
(A) remains the same
(B) reduces to zero
(C) enter into conduction mode
(D) rises a little and then falls to zero

21. The core of an optical fiber has
(A) a lower index of refraction than the cladding
(B) a lower index of refraction than air
(C) a higher index of refraction than the cladding
(D) refractive index equal to air

22. The core diameter of single mode fiber is in the order of
(A) 100 μm (B) 10 μm
(C) 1 Å (D) 1 nm

23. Laplace transform of e^{-at} sin wt is

(A) $\frac{w}{(s+a)^2+w^2}$ (B) $\frac{w}{(s-a)^2+w^2}$

(C) $\frac{w}{(s-a)^2-w^2}$ (D) $\frac{w}{(s+a)^2-w^2}$

24. Fourier transform or Fourier integral of a function f(t) is given by

(A) $\int_0^\infty f(t)\, e^{-st}\, dt$

(B) $\int_0^\infty f(t)\, e^{-jwt}\, dt$

(C) $\int_{-\infty}^{+\infty} f(t)\, e^{+jwt}\, dt$

(D) $\int_{-\infty}^{+\infty} f(t)\, e^{-jwt}\, dt$

25. Find the output of the program

```
# include <iostream.h>
set_val (int, int);
void main( )
    {   int a = 20, b = 10;
        set_val (a++, b++);
        printf ("\n" %d %d, a, b);
    }
        set_val (int x, int y)
        {
            x = x + y;
            y = y – x;
            x = x – y;
        }
```

(A) 10 and 20 (B) 11 and 21

(C) 20 and 40 (D) 21 and 41

26. The function "isalnum( )" returns a non-zero value if the character is alphanumeric and zero otherwise. What is header file to be used in the main program ?

(A) stdio.h (B) io.h

(C) ctype.h (D) string.h

27. To read a integer variable, find the correct format given below :

```
Int m;
```

(A) scanf ("\n %d", m);

(B) scanf ("\n %s, m);

(C) scanf ("\n %c", m);

(D) scanf ("\n %d", & m);

28.

D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

In 8255 programmable peripheral interface device, if the port A and port B are to be set in a hand shake mode along with port C, what are the bits in the 8 bit control word to be set as 0 1 0.

(A) D_6, D_5 and D_2

(B) D_5, D_4 and D_1

(C) D_6, D_3 and D_2

(D) D_5, D_2 and D_1

29. The number system for the machine code of the microprocessor 8085 is

(A) BCD

(B) Octal

(C) Binary

(D) Hexadecimal

30. Which of the options in a multipurpose instruction used to implement the interrupt of 8085 and serial data input ?

(A) SOD (B) SIM

(C) EJ (D) RST 7.5

31. A thermistor is used to measure the temperature. Following characteristics are given

1. They exhibit positive temperature coefficient and poor sensitivity.
2. They exhibit negative temperature coefficient for resistance.
3. Their resistance decreases with the increase in temperature.
4. They are made of oxides of semi conductors.

Which one of the following is correct ?

(A) 1 & 4 only (B) 1 & 3 only

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

32. In an FET, following characteristics are given :

1. JFET is called as variable current resistor.
2. JFET is called Voltage variable resistor.
3. $g_d = g_{d0}\left[1 - \sqrt{\left(\frac{V_{GS}}{V_P}\right)}\right]$, where, g_{d0} is value of drain to source conductance for zero bias.
4. $g_d = g_{d0}\left[1 + \left(\frac{V_{GS}}{V_P}\right)^2\right]$

Which one of the following is true ?

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

33. For a steady magnetic fields, which of the following is true :

1. The tangential component of magnetic field is continuous across any boundary except the surface of perfect conductor.
2. The tangential component of magnetic flux density is continuous across any boundary.
3. The normal component of magnetic flux density is continuous across any boundary.
4. The normal component of electric field is continuous across the boundary.

Which one of the following is correct ?

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

34. Given below are three types of converters :

(i) Successive approximation type
(ii) Weighted-resistor type
(iii) R-2R converters
(iv) Multiplexer

Which of these types are D to A converters ?

(A) Only (i) and (ii)
(B) Only (ii) and (iii)
(C) Only (ii) and (iv)
(D) Only (iii) and (iv)

35. Consider the following :

(i) Pulse – position – modulation
(ii) Pulse – Code – modulation
(iii) Pulse – Width modulation
(iv) Delta Modulation

The output of which of these in not digital ?

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

36. Consider the following statements :
A multiplexer :

1. selects one of the several inputs and transmits it to a single output.
2. routes the data from a single input to one of many outputs.
3. converts parallel data into serial data.
4. is a combinational circuit.

Which of these statements are correct ?

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

37. Consider the following statements :
Losses in optical fibers are caused by

1. Impurities in the fibre material
2. Microbending
3. Splicing
4. Step index profile

Of these statements :

(A) 1, 3 & 4 are correct.
(B) 2, 3 & 4 are correct.
(C) 1, 2 & 3 are correct.
(D) 1, 2 & 4 are correct.

38. Consider the following statements :
If an electric field is applied to an n-type semiconductor bar, the electrons and holes more in opposite directions due to their opposite charges. The net current is

1. due to both electrons and holes with electrons as majority carriers.
2. the sum of electron and hole currents.
3. the difference between electron and hole current.

Which of these statements is/are correct ?

(A) 1 alone (B) 1 and 2
(C) 2 and 3 (D) 3 alone

39. The state space approach is best suited technique for a complex system. It comprises of

(i) Many inputs
(ii) Many outputs
(iii) With no initial conditions
(iv) Reduces the complexity of mathematical expressions

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

40. Both 8155 and 8255 programmable peripheral interface ICS have the following common features :

(i) Programmable I/Os
(ii) Either port A or Port B can be set as either input or output ports.
(iii) One 14-bit down counter
(iv) AD_0 – AD_7 are multiplexed address/datalines.

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

41. Consider the following ICs :

1. LM 78 05
2. LM 78 15
3. LM 78 12

The correct sequence of the output noise voltage (at 25 °C and for an operating frequency range of 10 Hz $\leq$ f $\leq$ 100 KHz) in decreasing order is given by

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

42. Consider the following bands/waves :

1. L band 2. C band
3. K_u band 4. K_a band

Arrange them in increasing frequency order, the correct sequence of the ascending order in terms of frequency is

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

43. The correct sequence of components in any transmission system is

(i) Modulation
(ii) Base band Multiplexing
(iii) Up converter
(iv) IF amplifier

Codes :

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

44. The step, ramp and parabolic test input signals can respectively be expressed as

(A) $R(S) = \frac{A}{S}$; $R(S) = \frac{A}{S^2}$ and $R(S) = \frac{2A}{S^3}$

(B) $R(S) = A$; $R(S) = \frac{A}{S}$ and $R(S) = \frac{A}{S^2}$

(C) $R(S) = AS$; $R(S) = AS^2$ and $R(S) = 2AS^3$

(D) $R(S) = A$; $R(S) = \frac{2A}{S}$ and $R(S) = \frac{A}{S^3}$

45. Arrange in ascending order based on power dissipation the following logic families :

(i) ECL
(ii) TTL
(iii) CMOS

Codes :

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

46. Consider the following rectifier circuits :

1. Half-wave rectifier without filter
2. Full-wave rectifier without filter
3. Full-wave rectifier with series inductance filter
4. Full-wave rectifier with capacitance filter

The sequence of these rectifier circuits in decreasing order of the ripple factor is

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

47. The correct sequence of sub-systems of Klystron amplifiers as they appear in the direction of flow of electron beam is

(A) Buncher cavity, Cathode, Collector, Catcher cavity
(B) Buncher cavity, Cathode, Catcher cavity, Collector
(C) Cathode, Buncher cavity, Catcher cavity, collector
(D) Cathode, Buncher cavity, collector, Catcher cavity

48. In a closed loop automatic control system, the sequence of operations is as follows :

(i) Controlling unit
(ii) Correcting unit
(iii) Impact on the process
(iv) Measurement of process parameters

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

49. Find the correct list, which is the reverse (at all levels) of the given list :

[[4, 7, 8], 2, 9, [19, 6], 20, 3]

(i) 3, 20
(ii) 9, 2
(iii) [6, 19]
(iv) [8, 7, 4]

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

50. Each instruction in an assembly program has the following fields :

(i) Lable field
(ii) Operand field
(iii) Comment field
(iv) Mnemonic field

Please write the proper sequence of fields :

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

51. Match the following lists :

List – I	**List – II**
a. Voltage series feedback	i. Trans resistance amplifier
b. Current series feedback	ii. Current shunt feed back
c. Current amplifier	iii. Trans-conductance
d. Voltage shunt feedback	iv. Voltage amplifier

Codes :

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

52. Match the following lists :

List – I	List – II
a. Ferrite devices	i. < 1
b. Dominant mode	ii. > 1
c. Reflection coefficient	iii. Circulators
d. VSWR	iv. Waveguide

The correct sequence is :

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

53. Match the following lists of various thermocouples & sensitivity:

List – I	List – II
a. Copper constantan	i. 3-20 μv/°C
b. Chromel/ Alumel	ii. 5-12 μv/°C
c. Tungsten / Tungsten 26% Rhenium	iii. 15-60 μv/°C
d. Platinum / Platinum 10% Rhodium	iv. 40-55 μv/°C

The correct match is :

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

54. Match the following lists :

List – I	List – II
a. PCM	i. Slope overload distortion
b. DM	ii. Constant carrier frequency
c. AM	iii. Encoding
d. TDM	iv. Commutator

The correct match is :

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

55. Match the following :

List – I	List – II
a. 7400	i. Quad-2 input AND gate
b. 7402	ii. Quad-2 input OR gate
c. 7408	iii. Quad-2 input NAND gate
d. 7403	iv. Quad-2 input NOR gate

Codes :

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

56. Match the following :

List – I	List – II
a. LASER	i. Emits monochromatic light of low intensity
b. Solar cell	ii. Consumes electrical power due to the incident light
c. Photo diode	iii. Delivers power to load
d. LED	iv. Emits monochromatic light of high intensity

Codes :

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

57. Match the following :

List – I (Biasing of BJT)	List – II (Functions)
a. E-B junction forward bias and C-B junction reverse bias	i. Very low gain amplifier
b. Both E-B and C-B junctions forward bias	ii. Saturation condition
c. E-B junction reverse bias and C-B junction forward bias	iii. High gain amplifier
d. Both E-B and C-B junctions reverse bias	iv. Cut-off condition

Codes :

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

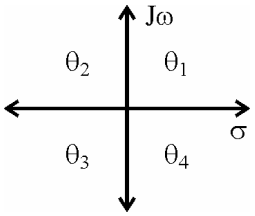
58. The mnemonic of 8085 processor indicate :

List – I	List – II
a. RLC	i. Rotate Accumulator Right through carry
b. RRC	ii. Rotate Accumulator Left through carry
c. RAR	iii. Rotate Accumulator Left
d. RAL	iv. Rotate Accumulator Right

Codes :

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

59. The stability of the system for different locations of poles and zeroes :



a. Stable	i. θ_4
b. Unstable	ii. θ_2
c. Stable in limited sense or marginally stable	iii. θ_1
d. Asymptotic	iv. θ_3

Codes :

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

60. Match the following :

List – I (Pin terminals)	List – II (Applications)
a. SID, SOD	i. Wait state
b. READY	ii. Serial data transfer
c. TRAP	iii. Address Latch Control
d. ALE	iv. Interrupt

Codes :

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

Directions : Q. Nos **61** to **70** : The following items consist 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 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 accordingly.

Assertion (A) :

Reason (R) :

Codes :

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

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

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

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

61. **Assertion (A) :** TWTA is a narrow band device and has a helical structure and it is used as amplifier and oscillator.

Reason (R) : In TWT, the electron beam travels through a slow-wave structure and speed of electron beam is $\frac{1}{10}$ of the velocity of light.

62. **Assertion (A) :** An Op-Amp is a direct coupled high gain amplifier.

Reason (R) : It consists of one or more differential amplifiers and usually followed by a level translator and push pull stage.

63. **Assertion (A) :** To have a high sensitivity, a low value of gauge factor is desirable.

Reason (R) : Semi-conductor strain gauges are made up of Si and Ge and show piezo-resistive effect.

64. **Assertion (A) :** In amplitude modulation technique the modulation index should be close to 1.

Reason (R) : The power carried by message signal in the side bands increases with increase in modulation index.

65. **Assertion (A) :** In logic circuit, positive logic is represented by logic "0" voltage level is lower than logic "1" voltage level.

Reason (R) : Excess 3 code is known as self complementary code.

66. **Assertion (A) :** A self-biased circuit has a better stability than a fixed bias circuit.

Reason (R) : It provides negative feed back by the use of an additional resistor between the base and ground.

67. **Assertion (A) :** Optical fibers have broader bandwidth compared to conventional copper cables.

Reason (R) : Low power LASER beams are considered to be very powerful as compared to high power ordinary light beams.

68. **Assertion (A) :** A demultiplexer can be used as a decoder.

Reason (R) : A demultiplexer is built by using AND gates only.

69. **Assertion (A) :** In serial communication system, when the transmission of data goes in both ways, it is called full-duplex system. Now if two micro processors are connected in full duplex mode, the amount of data transmitted will be double to the amount of data in half-duplex mode connection.

Reason (R) : When the transmission of data goes in one way, it is called half-duplex system and when the data moves in both ways, it is called full duplex system.

70. **Assertion (A) :** In control systems, steady state response in the final requirement for calculating the efficiency of the system.

Reason (R) : The transient response is also critical for the determination of the steady state response.

Read the paragraph and answer the question **71** to **75** :

Microwave tubes are used as microwave amplifiers and oscillators. Three general type of microwave tubes in which third type tubes are important because in these tubes there is an interaction between an electron and an RF field is continuous. The Travelling Wave Tube (TWT) is the prime example of this interaction. It is an amplifier, whose oscillator counter part is called Backward Wave Oscillator (BWO). The second sub-group consists of tubes in which a magnetic field ensures a constant electron beam – RF field interaction, and this is complemented by the Cross-Field Amplifier (CFA). Multicavity Klystron is used as high and very high power amplifiers in the UHF and microwave ranges. The frequency range covered is from about 250 MHz to over 95 GHz. The reflex-Klystron is a low power microwave oscillator. It is assumed that oscillations are started by switching transients. For oscillations to be maintained the transient time in the repeller space cycle is given as $T = \left(n + \frac{3}{4}\right)$ where n is an integer, each value of n is said to correspond to different reflex klystron mode. Reflex Klystrons with integral cavities are available in the frequency range 4 to 200 GHz.

71. One of the reasons why vacuum tubes eventually fail at microwave frequencies in that their
(A) transit time becomes too short
(B) shunt capacitive reactance becomes too large
(C) series inductive reactance becomes too small
(D) noise figure increases

72. The Multicavity Klystron
(A) is not low-level amplifier because of noise
(B) has a high repeller voltage to ensure a rapid transit time.
(C) is not suitable for pulsed operation
(D) needs a long transit time through the buncher cavity to ensure current modulation

73. The primary of the helix in a travelling wave tube is to
(A) prevent the electron beam from spreading in the long tube
(B) reduce the axial velocity of the RF field
(C) ensure broadband operation
(D) reduce the noise figure

74. One of the following is unlikely to be used as a pulsed device. It is the
(A) TWT
(B) CFA
(C) BWO
(D) Multicavity Klystron

75. Indicate the false statement. Klystron amplifiers may use intermediate cavities to
(A) prevent the oscillations that occur in two cavity Klystrons
(B) increase the bandwidth of the device
(C) improve the power gain
(D) increase the efficiency of the Klystron

Space For Rough Work