Signature and Name of Invigilator

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

Answer Sheet No. : .....

(To be filled by the Candidate)

Roll No. | | | | | | | |

(In figures as per admission card)

Roll No. _____

(In words)

Test Booklet No.

D–8807

PAPER–II

Time : 1¼ hours] **ELECTRONIC SCIENCE** **[Maximum Marks : 100**

Number of Pages in this Booklet : **16** 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 Serial No. of the booklet should be entered in the Answer-sheets and the Serial No. of Answer Sheet should be entered on this Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval 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 Answer Sheet given **inside the Paper I booklet only**. If you mark at any place other than in the ovals in the Answer 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 or put any mark on any part of the test booklet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. You have to return the test question booklet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.
10. **Use only Blue/Black Ball point pen.**
11. **Use of any calculator or log table etc., is prohibited.**
12. **There is NO negative marking.**

परीक्षार्थियों के लिए निर्देश

1. पहले 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 अर्थात 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 प्रश्न-पुस्तिका की क्रम संख्या उत्तर-पत्रक पर अंकित करें और उत्तर-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 दीर्घवृत्त 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** उत्तर-पत्रक पर ही अंकित करने हैं। यदि आप उत्तर पत्रक पर दिये गये दीर्घवृत्त के अलावा किसी अन्य स्थान पर उत्तर चिन्हांकित करते है, 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 उत्तर-पुस्तिका पर अपना नाम या ऐसा कोई भी निशान जिससे आपकी पहचान हो सके, किसी भी भाग पर दर्शाते या अंकित करते हैं तो परीक्षा के लिये अयोग्य घोषित कर दिये जायेंगे।
9. आपको परीक्षा समाप्त होने पर उत्तर-पुस्तिका निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद अपने साथ परीक्षा भवन से बाहर न लेकर जायें।
10. **केवल नीले/काले बाल प्वाईंट पैन का ही इस्तेमाल करें।**
11. **किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।**
12. **गलत उत्तर के लिए अंक नहीं काटे जायेंगे।**

ELECTRONIC SCIENCE

PAPER – II

Note : This paper contains **fifty** (50) objective-type questions, each question carrying **two** (2) marks. Attempt **all** of them.

1. In a tunnel diode, the width of depletion layer is of the order of :

(A) 10 Micron (B) 1 Micron

(C) 0.1 Micron (D) 1 Angstrom

2. The Major Component of MOSIC is :

(A) BJT (B) JFET (C) MOSFET (D) SCR

3. A network which contains one or more than one source of e.m.f. is known as :

(A) active network (B) passive network

(C) electric network (D) non-linear network

4. Norton's theorem results is :

(A) a current source with an impedance in parallel

(B) a voltage source with an impedance in series

(C) a voltage source alone

(D) a current source alone

5. The first generation of IC OP-AMP was :

(A) Fair Child μA 709 (B) T.I SN 72709

(C) Motorola's MC 1709 (D) National Semiconductor's LM 709

6. The minimum number of diodes needed for a bridge rectifier is :

(A) 1 (B) 2 (C) 4 (D) 8

7. The excess - 3 code for decimal number 19 is :

(A) 0100 1100 (B) 10011 (C) 10100 (D) 10101

8. Digital IC's do not use :

(A) p-channel MOSFET (B) n-channel MOSFET

(C) JFET (D) n-p-n transistor

9. An address is the number used by the central processing unit for specifying a location in the :

(A) Flag (B) Accumulator

(C) Memory (D) Stack Pointer

10. 2×8 RAM stores :

(A) 8, 2-bit data words (B) 2, 8-bit data words

(C) 16, 1-bit data words (D) 1, 16-bit data words

11. In a 8-bit Microcomputer having 8k bytes of RAM Memory, the length of stack pointer will be :

(A) 5 (B) 8 (C) 11 (D) 13

12. If the HLT instruction of 8085 Microprocessor is executed :

(A) The microprocessor is disconnected from the system bus

(B) The microprocessor enters into Halt State and the buses are tri-stated

(C) The microprocessor halts execution of the program and returns to stop state

(D) The microprocessor reloads the program from the location 0024H to about 0025H

13. The input impedance of a folded dipole antenna is about :

(A) 100 ohms (B) 220 ohms (C) 377 ohms (D) 280 ohms

14. A PIN diode is :

(A) a metal semiconductor point contact diode

(B) a microwave mixer diode

(C) often used as a microwave detector

(D) suitable for use as a microwave switch

15. A deemphasis circuit is a :

(A) high-pass filter at the transmitter (B) low-pass filter at the transmitter

(C) high-pass filter at the receiver (D) low-pass filter at the receiver

16. An IC that contains A/D and D/A converters, comparaters and parallel to serial converters is called a :

(A) CODEC (B) MODEM

(C) Data Converter (D) Data Discriminator

17. The PUT is :

(A) not a thyristor

(B) like the UJT

(C) not a four layered device

(D) triggered ON and OFF by the gate to anode voltage

18. The value of the intrinsic-stand-off ratio for a UJT is :

(A) more than 1 (B) less than 1 (C) equal to 1 (D) 0

19. With the presence of feedback system the transient response :

(A) decays rapidly (B) rises slowly

(C) rises quickly (D) decays slowly

20. Electronic control systems have the problem of :

(A) operational difficulty (B) temperature sensitiveness

(C) low reliability (D) high reliability

Questions 21 to 30 : 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.

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

21. ***Assertion (A)*** : Strain gauge is an active transducer.

Reason (R) : Strain gauge converts mechanical displacement into change of resistance.

22. ***Assertion (A)*** : In a quartz crystal, at resonance the phase shift between output and input is zero.

Reason (R) : Crystal oscillators provide an extremely stable and precise output frequency.

23. ***Assertion (A)*** : When a stable second order performance is improved by using a PID controller in its forward path, the system could become unstable.

Reason (R) : The PID controller increases the order of the system to three.

24. ***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.

25. ***Assertion (A)*** : The phase angle plot in Bode diagram is not affected by the variation in the gain of the system.

Reason (R) : The variation in the gain of the system has no effect on the phase margin of the system.

26. ***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.

27. ***Assertion (A)*** : Optical fibers have broader band width to conventional copper cable.

Reason (R) : The information carrying capacity of optical fibers is limited by dispersion.

28. ***Assertion (A)*** : XOR gate is not a universal gate.

Reason (R) : It is not possible to realize any Boolean function using XOR gates only.

29. ***Assertion (A)*** : Semiconductors have negative temperature co-efficient of resistivity.

Reason (R) : Insulators also have negative temperature co-efficient of resistivity.

30. ***Assertion (A)*** : Radio and Television receivers are generally of the super heterodyne type.

Reason (R) : Wireless communication is possible by receiving signals through superheterodyne receivers.

31. The input resistance of a common emitter stage can be increased by :

(i) Unbypassing emitter resistance

(ii) Bootstrapping

(iii) Biasing it at low quescent current

(iv) Using compounded BJTs

The correct sequence in descending order of the effectiveness of these methods is :

(A) *(ii), (iv), (i), (iii)* (B) *(iv), (iii), (ii), (i)*

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

32. Consider the following semiconductor diodes :

(i) Germanium diode

(ii) Silicon diode

(iii) Tunnel diode

(iv) Schottky diode

The correct increasing order of forward voltage drop of these diodes is :

(A) *(i), (iii), (iv), (ii)* (B) *(i), (ii), (iii) (iv)*

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

33. The various processor chips which operate at different speeds are :

(i) 8086

(ii) P-II

(iii) P-III

(iv) 8085

The correct sequence according to their speed of operation in increasing order is :

(A) *(i), (ii), (iii), (iv)* (B) *(iv), (i), (ii), (iii)*

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

34. Consider the following communication systems :

(i) F.M. Broadcast systems

(ii) A.M. Broadcast systems

(iii) Microwave communication systems

(iv) Optical communication systems

The correct sequence of these systems from the point of view of increasing order of frequency is :

(A) *(i), (ii), (iii), (iv)* (B) *(iv), (ii), (i), (iii)*

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

35. The different types of memories are :

(i) Magnetic tape

(ii) Floppy disk

(iii) RAM

(iv) Hard disk

The correct sequence of decreasing order of memory is :

(A) *(iv), (iii), (i), (ii)* (B) *(i), (iv), (iii), (ii)*

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

36. Match ***List-I*** with ***List-II*** and select the correct answer using the codes given below the lists :

List-I	***List-II***
(a) Zener diode	(i) Voltage stabilizer
(b) SCR	(ii) Pinch-off effect
(c) FET	(iii) Controlled rectifier
(d) Tunnel diode	(iv) Microwave oscillator

Codes :

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

37. Match ***List-I*** with ***List-II*** and select the correct answer using the codes given below the lists :

	List-I		***List-II***
(a)	Thevenin's theorem	(i)	Open circuit
(b)	Norton's theorem	(ii)	Unity
(c)	Laplace transform of impulse function	(iii)	Passive circuit
(d)	Diode	(iv)	Closed circuit

Codes :

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

38. Match ***List-I*** with ***List-II*** and select the correct answer using the codes given below the lists :

	List-I		***List-II***
(a)	Darlington amplifier	(i)	Low input impedance
(b)	Cascade amplifier	(ii)	Low output impedance
(c)	Common gate amplifier	(iii)	Low input capacitance but high R_{in}
(d)	Differential amplifier	(iv)	Large Common Mode Rejection Ratio

Codes :

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

39. Match ***List-I*** with ***List-II*** and select the correct answer using the codes given below the lists :

	List-I		***List-II***
(a)	TTL	(i)	Maximum power consumption
(b)	ECL	(ii)	Highest package density
(c)	NMOS	(iii)	Least power consumption
(d)	CMOS	(iv)	Saturated Logic

Codes :

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

40. Match ***List-I*** with ***List-II*** and select the correct answer using the codes given below the lists :

	List-I		***List-II***
(a)	Sign flag	(i)	7th bit
(b)	Zero flag	(ii)	8th bit
(c)	Parity flag	(iii)	1 bit
(d)	Carry flag	(iv)	3rd bit

Codes :

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

41. Match ***List-I*** with ***List-II*** and select the correct answer using the codes given below the lists :

	List-I		***List-II***
(a)	Frequency modulation	(i)	Envelop detection
(b)	Double sideband suppressed carrier	(ii)	Companding
(c)	PCM	(iii)	Balanced Modulator
(d)	Amplitude modulation	(iv)	Pre-emphasis and de-emphasis

Codes :

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

42. Match ***List-I*** with ***List-II*** and select the correct answer by using the codes given below the lists :

	List-I		***List-II***
(a)	Reflex Klystron	(i)	Low power oscillator
(b)	Magnetron	(ii)	High power oscillator
(c)	Klystron	(iii)	Low power amplifier
(d)	Tunnel diode	(iv)	High power amplifier

Codes :

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

43. Match ***List-I*** with ***List-II*** and select the correct answer using the codes given below the lists :

	List-I		***List-II***
(a)	LASER	(i)	Spontaneous emission
(b)	Solar cell	(ii)	Stimulated emission
(c)	LED	(iii)	Delivers power to a load
(d)	Photo diode	(iv)	Detects the light incident upon it

Codes :

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

44. Match ***List-I*** with ***List-II*** and select the correct answer using the codes given below the lists :

	List-I		***List-II***
(a)	LVDT	(i)	Pressure
(b)	Bourdon tube	(ii)	Temperature
(c)	Strain gauge	(iii)	Displacement
(d)	Thermistor	(iv)	Stress

Codes :

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

45. Match ***List-I*** with ***List-II*** and select the correct answer by using the codes given below the lists :

	List-I		***List-II***
(a)	Multiplexer	(i)	Sequential memory
(b)	De-multiplexer	(ii)	Converts decimal number to binary
(c)	Shift-register	(iii)	Data selector
(d)	Encoder	(iv)	Routes out many data output with single input

Codes :

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

Read the passage below and answer the questions that follow based on your understanding of the passage :

Many disturbances of an electrical nature produce noise in receivers, modifying the signal in an unwanted manner. In radio receivers, for example, noise may produce hiss in the loudspeaker output, whereas in television receivers 'snow' or coloured snow becomes superimposed in the picture. In pulse communication systems, noise may produce unwanted pulses or perhaps cancel out the wanted ones; it may cause serious errors in this faction. Noise is thus seen as limiting the range of systems, for a given transmitted power. It affects the sensitivity of receivers, by placing a limit on the weakest signals that can be amplified. It may sometimes even force a reduction in the bandwidth of a system as seen in radar.

There are numerous ways of classifying noise. It may be subdivided according to type, source, effect or relation to the receiver and noise created within the receiver itself. On the other hand, external noise is difficult to treat quantitatively. Radiotelescopes and International satellite earth stations are located in noise-free valleys. Internal noise is both more quantifiable and capable of being reduced by appropriate receiver design.

Atmospheric noise becomes less severe at frequencies above 30 MHz because of two separate factors. First the higher frequencies are limited to line-of-sight propagation less than 80 km. Second the nature of the mechanism generating this noise such that very little of it is created in the very high frequency range.

46. Why noise is considered as important parameter in telecommunication ?

(A) noise of some type may not create unwanted signal

(B) noise interferes in introducing unwanted signals at the receiver

(C) noise may increase the frequency of the receiver

(D) noise may decrease the amplitude of the pulse in communication system

47. The effect of internal and external noise on radar is that :

(A) the bandwidth of the radar increases

(B) the bandwidth of the radar decreases

(C) the temperature of the radar decreases

(D) the amplitude of the radar signal decreases

48. One of the following types of noise becomes of great importance at high frequencies. It is the :

(A) Shot noise (B) Random noise

(C) Impulse noise (D) Transit-time noise

49. One of the following is not a useful quantity for comparing the noise performance of receivers :

(A) Input noise voltage (B) Equivalent noise resistance

(C) Noise temperature (D) Noise figures

50. Indicate the false statement :

(A) HF mixers are generally noiser than HF amplifiers

(B) Impulse noise voltage is independent of bandwidth

(C) Thermal noise is independent of the frequency at which it is measured

(D) Industrial noise is usually of the impulse type

- o O o -

Space For Rough Work