PAPER-III
ELECTRONIC SCIENCE

Signature and Name of Invigilator

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

D	8	8	1	4

Time : 2 ½ hours]

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 Pages in this Booklet : **16** | 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. इस 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 on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.	(i) प्रश्न-पुस्तिका खोलने के लिए उसके कवर पेज पर लगी कागज की सील को फाड़ लें । खुली हुई या बिना स्टिकर-सील 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 : Ⓐ Ⓑ ● Ⓓ where (C) is the correct response.	उदाहरण : Ⓐ Ⓑ ● Ⓓ 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 such as change of response by scratching or using white fluid, 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, जैसे कि अंकित किये गये उत्तर को मिटाना या सफेद स्याही से बदलना तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
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.	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. **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 नकारात्मक अंक नहीं हैं ।

D-88-14

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P.T.O.

ELECTRONIC SCIENCE
PAPER – III

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

1. The basic purpose of biasing a transistor with a network is
   (A) to reduce the power dissipation
   (B) to improve the gain
   (C) to improve the stability
   (D) to improve the frequency response

2. The depletion capacitance C_j of an abrupt p-n junction diode with uniform doping on either side varies with reverse V_R as
   (A) $C_j \propto V_R$ (B) $C_j \propto V_R^{-1}$
   (C) $C_j \propto V_R^{\frac{-1}{2}}$ (D) $C_j \propto V_R^{\frac{-1}{3}}$

3. The Laplace transform converts integro-differential equation in _____ domain.
   (A) 6   (B) S
   (C) jw   (D) ξ

4. The switch is thrown to position 1. What will be the current in the circuit in the steady state condition ?
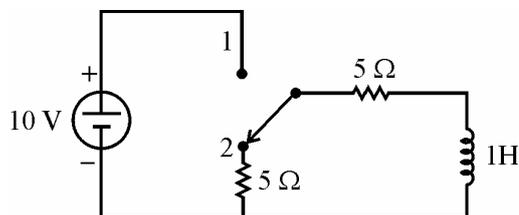
   (A) 1A   (B) 2A
   (C) 3A   (D) 4A

5. Which of the following oscillations makes use of both positive and negative feedback ?
   (A) Hartley   (B) Collpitt
   (C) Phase shift   (D) Wein Bridge

6. The active filter works well
   (A) at all frequencies   (B) at high frequencies
   (C) at zero frequency   (D) at audio frequencies

7. The number of flip-flops required to divide input frequencies by (32)

(A)   3   (B)   4

(C)   5   (D)   6

8. Which flip-flop can be used as latch ?

(A)   R-S Flip-flop   (B)   J-K Flip-flop

(C)   T- Flip-flop   (D)   D- Flip-flop

9. The I/O devices can be accessed in a memory map using the 8085 µp instruction

(A)   IN addr or OUT addr

(B)   LDA addr or STA addr

(C)   MOV M, A or MOV A, M

(D)   MVI M data

10. Which flag of 8051 works as 1-bit accumulator ?

(A)   C   (B)   FO

(C)   P   (D)   OV

11. Which bitwise operator is suitable for turning off a particular bit in a number ?

(A)   && operator   (B)   & operator

(C) || operator   (D)   ! operator

12. Which storage class is used for the variables that are often required in a program ?

(A)   STATIC   (B)   REGISTER

(C)   EXTENT   (D)   AUTO

13. When the Q of an antenna increases, the bandwidth

(A)   increases   (B)   decreases

(C)   remains constant equal to zero   (D)   equal to unity

14. The information capacity (bits/sec.) of a channel with bandwidth W and transmission time T is given by

(A)   WT   (B) $\dfrac{W}{T}$

(C) $\dfrac{T}{W}$ (D) $\dfrac{W^2}{T}$

15. _____ diode is not used as a microwave mixer or detector.

(A)   Schottky diode   (B)   PIN

(C)   Crystal   (D)   Backward

16. A super-heterodyne receiver has an intermediate frequency (IF) of 465 kHz. If it is tuned to a station broadcasting at 500 kHz and its oscillator operating at 965 kHz, then image frequency would be

(A) 1530 kHz   (B) 1430 kHz

(C) 1210 kHz   (D) 1020 kHz

17. UJT relaxation oscillator is a special case of

(A) Astable multivibrator

(B) Monostable multivibrator

(C) Bistable multivibrator

(D) Astable multivibrator with duration of the semistable state zero

18. After firing an SCR, if the gate pulse is removed, the SCR current

(A) remains the same   (B) reduces to zero

(C) rises up   (D) rises a little and then falls to zero

19. In a normal ECG wave form, which wave has the maximum amplitude ?

(A) P-wave   (B) R-wave

(C) Q-wave   (D) T-wave

20. If the characteristic equation of a closed loop system is $S^2 + 2S + 2 = 0$, then the system is

(A) over damped   (B) critically damped

(C) underdamped   (D) undamped

21. The doping concentration of n-p-n transistor are

i. $5 \times 10^{18} / cm^3$

ii. $10^{17} / cm^3$

iii. $2 \times 10^7 / cm^3$

Identify the regions in the above order i, ii and iii.

(A) C, B, E   (B) E, B, C

(C) C, E, B   (D) E, C, B

22. Which is not a proper way of array declaration ?

(A) int num [6] = {2, 4, 12, 5, 45, 5}

(B) int a(25) ;

(C) int n [ ] = {2, 4, 12, 5, 45, 5}

(D) float press [ ] = {12.3, 34.2, –23.4, –11.3}

23. Exponentiation operation in C is carried out as

(A) a = 3 $*$ $*$ 2   (B) a = 3 $^\wedge$ 2

(C) a = pow (3, 2)   (D) a = 3 exp(2)

24. The phase method for generation of a SSB signal is most suitable for
(A) data signals
(B) weak modulating signals
(C) larger bandwidth modulating signals
(D) smaller bandwidth modulating signals

25. Which of the following sensors has excellent linearity ?
(A) RTD   (B) Thermo-couple
(C) Radiation Pyrometer   (D) Si based IC chip

26. The sinusoidal transfer functions are commonly represented by
(A) Routh's criteria   (B) Nyquist criteria
(C) Bode Plot   (D) Root Locas

27. Which of the following digital modulation systems support high bit rate ?
(A) ASK   (B) PSK
(C) FSK   (D) ASK & FSK

28.
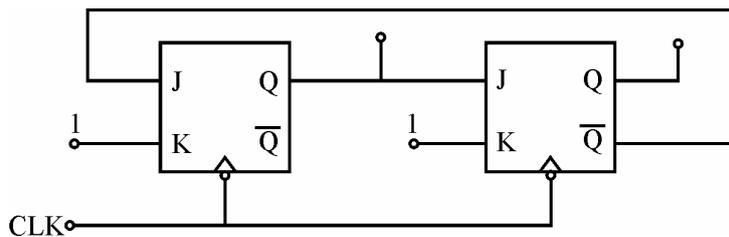
What is the modulus of the counter ?
(A) 1   (B) 3
(C) 2   (D) 4

29. Pointer Vector for an electromagnetic wave is
(A) $\vec{H} \cdot \vec{E}$ (B) $\vec{H} \times \vec{E}$
(C) $\vec{E} \times \vec{H}$ (D) $\vec{E} \cdot \vec{H}$

30. An amplifier has open-loop voltage gain of 40.10% of negative feedback is effected. What will be the gain with feedback ?
(A) 40   (B) 32
(C) 16   (D) 8

31. In a p-n junction diode
1. In reverse bias mode the bulk resistance is dominant.
2. The junction impedance is variable.
(A) Statements 1 and 2 are correct.
(B) Statements 1 and 2 are wrong.
(C) Statement 1 is wrong while statement 2 is correct.
(D) Statement 1 is correct while statement 2 is wrong.

32. Read the following statements :
ST 1 : y-parameters can be obtained from Z parameters.
ST 2 : It is not necessary to define y-parameters separately.
(A) ST 1 is correct, ST 2 is wrong.
(B) ST 1 is wrong, ST 2 is correct.
(C) ST 1 and ST 2 are wrong.
(D) ST 1 and ST 2 are correct.

33. Negative feedback in amplifier results in
1. reduced voltage gain
2. reduced bandwidth
3. increased S/N ratio
4. reduced distortion of these
(A) 1 and 2 are correct.   (B) 1, 3 and 4 are correct.
(C) 2, 3 and 4 are correct.   (D) 1 and 2 are correct.

34. K-map method of simplifications can not be applied when the given functions is in
1. Sum of product forms
2. Product of sum forms
3. Canonical forms
4. Can be applied to all forms
(A) 1 and 2 are correct.   (B) 1, 2 and 4 are correct.
(C) 3 only   (D) 2 & 4 are correct.

35. Read the following statements :
ST 1 : Queue is provided in 8086.
ST 2 : Slow memory does not degrade speed operation of 8086.
(A) ST1 and ST2 are wrong.
(B) ST1 and ST2 are correct.
(C) ST1 is wrong and ST2 is correct.
(D) ST1 is correct and ST2 is wrong.

36. Which operators can be used with float ?

1. %
2. *
3. /
4. =

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

37. Binary ASK modulation gives

ST1 : High noise immunity
ST2 : Large bandwidth

(A) ST1 is wrong, ST2 is correct.
(B) ST1 is correct, ST2 is wrong.
(C) ST1 and ST2 are wrong.
(D) ST1 and ST2 are correct.

38. Which of the following are Maxwell equations ?

1. $B = \mu H$ 2. $E = \dfrac{D}{\in}$

3. $E = \dfrac{J}{\sigma}$ 4. $E = \in D$

Select the correct answer :

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

39. For SCR which statements are correct ?

ST1 : SCR should be fired with zero gate current.

ST2 : $\dfrac{dv}{dt}$ failure occurs due to temperature.

(A) ST1 and ST2 are wrong.
(B) ST1 and ST2 are correct.
(C) ST1 is correct and ST2 is wrong.
(D) ST1 is wrong, ST2 is correct

40. In comparison to LED, LASER has

1. high emission frequency
2. no tuning arrangement
3. narrow spectral bandwidth
4. provision for confinement of these

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

41. Which of the following are useful in comparing the noise performance of receivers ?

1. Input noise voltage
2. Equivalent noise resistance
3. Noise temperature
4. Noise figure

Select the correct answer.

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

42. Which is not the effect of addition of open loop zeroes on the stability of the system ?

1. increasing stability   2. making system oscillatory
3. decreasing stability   4. shifting root-locas towards imaginary axis

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

43. Consider the following :

1. In semiconductors, the mobility of electrons is more than that of holes.
2. In semiconductors, the resistivity increases with the increase in temperature.
3. Metal has positive TCR.
4. In metals, thermal conductivity is inversely proportional to electronic conductivity at a particular temperature.

Which of the following statements are correct ?

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

44. Which of the following circuits will have transients ?

1. Resistive
2. R-L
3. R-C
4. R-L-C

Which is correct ?

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

45. Consider the following :

ST1 : F.M. signal produces more side bands than A.M.
ST2 : The carrier in a F.M. signal can never be dropped to zero amplitude.

Which of the following is valid ?

(A) Neither ST1 nor ST2 (B) Both ST1 and ST2
(C) ST1 and not ST2 (D) ST2 and not ST1

46. 8085 µp instructions are given below

    1.   STA addr

    2.   CALL addr

    3.   MOV R_d, R_s

    4.   ADI data

Arrange these in the ascending order of number of clock cycles required to execute them.

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

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

47. If P $\longrightarrow$ Passivation, Q $\longrightarrow$ n-well implant, R $\longrightarrow$ Metallization and S $\longrightarrow$ Source/drain diffusion

The sequence in which these are carried out in a n-channel CMOS fabrication is

    (A)   P – Q – R – S   (B)   Q – S – R – P

    (C)   R – P – S – Q   (D)   S – R – Q – P

48. Arrange the following NINV – Op-Amps in the increasing order of the bandwidth :

    1.   unity gain

    2.   gain = 10

    3.   gain = 100

    4.   gain = 20

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

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

49. Arrange the following devices in the increasing order of 8-bit general purpose registers these contain :

    1.   8085

    2.   8051

    3.   8086

    4.   8255

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

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

50. Arrange in the increasing order of temperature coefficient :

    1.   Zener diode with breakdown voltage 6 V

    2.   Zener diode with breakdown voltage > 6V in series with a p-n diode

    3.   Zener diode with breakdown voltage < 6 V

    4.   Zener diode with breakdown voltage < 6 V in series with a Si-Pn junction diode

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

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

51. Match the given lists :

List – I		List – II
(Name of the Device)		**(Application)**
a.	Diode	i.	Rectification
b.	Tunnel diode	ii.	Microwave switching
c.	Zener diode	iii.	An oscillator
d.	PIN diode	iv.	Voltage regulation

Codes :

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

52. Match the given lists :

List – I

a. Condition of reciprocity

b. h_{12}

c.
$$\begin{bmatrix} R & R \\ R & R \end{bmatrix}$$
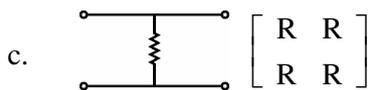
d. Condition of symmetry

List – II

i. $\dfrac{Z_{12}}{Z_{22}}$

ii. $Z_{12} = Z_{21}$

iii. Z

iv. $Z_{11} = Z_{22}$

Codes :

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

53. Match the following :

List – I		List – II
a.	CE-amplifier	i.	Low bandwidth high input impedance amplifier
b.	CB-amplifier	ii.	Audio frequency amplifier
c.	JFET amplifier	iii.	Radio frequency amplifier
d.	CC-amplifier	iv.	Buffer amplifier

Codes :

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

54. Match the following :

	List – I		List – II
a.	Shift Register	i.	Frequency Division
b.	Multiplexer	ii.	Memory chip select generation
c.	Decoder	iii.	Parallel to serial conversion
d.	Counter	iv.	Many to one switch

Codes :

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

55. Match the following :

	List – I		List – II
a.	8051	i.	serial data transfer
b.	8086	ii.	bit addressable RAM
c.	8085	iii.	bit set mode
d.	8255	iv.	variable port addressing

Codes :

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

56. Match the following :

	List – I		List – II
a.	Relational operator	i.	Executed atleast once
b.	while (1)	ii.	to exit the loop
c.	do-while	iii.	&&
d.	break	iv.	infinite loop

Codes :

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

57. Match the following :

	List – I		List – II
a.	Loop antenna	i.	sharp broadside null
b.	Rhombic antenna	ii.	long wire antenna
c.	Folded dipole	iii.	300 ohms
d.	Horizontal antenna	iv.	horizontal polarization

Codes :

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

58. Match the following :

	List – I		List – II
a.	LED	i.	Heavily doped
b.	Avalanche Photodiode	ii.	Coherent radiation
c.	Tunnel diode	iii.	Spontaneous emission
d.	LASER	iv.	Current gain

Codes :

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

59. Match the following :

	List – I		List – II
a.	Maxwell's Bridge	i.	Measurement of unknown inductance
b.	Hay's Bridge	ii.	Measurement of High Q coils
c.	Schering's Bridge	iii.	Precision measurement of capacitance
d.	Wein's Bridge	iv.	To measure frequency

Codes :

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

60. Match the following :

	List – I		List – II
a.	Storage oscilloscope	i.	Pulse testing
b.	Sampling oscilloscope	ii.	Time domain
c.	High frequency oscilloscope	iii.	Long term memories
d.	Low frequency oscilloscope	iv.	Servo system analyzer

Codes :

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

Directions for questions **61** to **70** : The following items consists of two statements, one labelled the "Assertion (A)" and the other labelled "Reason (R)". You are to examine the 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.

61. **Assertion (A) :** In avalanche breakdown, the temperature coefficient is positive.

   Reason (R) : In zener breakdown the temperature coefficient is positive.

62. **Assertion (A) :** Capacitor input filter gives a high output voltage which drops as the load is increased.

   Reason (R) : Capacitor input filters produce more heating in the rectifiers.

63. **Assertion (A) :** Op-Amp is used for sensor circuit.

   Reason (R) : A small signal amplifier amplify weak measured signals.

64. **Assertion (A) :** Dual slope (A/D) converter is the most preferred conversion technique employed in most of the digital multimeters.

   Reason (R) : Dual slope (A/D) converter provides high accuracy while at the same time suppresses the HUM effect on the input signal.

65. **Assertion (A) :** Any program written for 8080 will run without any changes on 8085.

   Reason (R) : Any program written for 8086 will run without changes on 8085.

66. **Assertion (A) :** 'C' provides a switch statement.
    Reason (R) : In order to select one alternative out of many, there is no provision in C. It has to be done by user defined function.

67. **Assertion (A) :** The system of propagation in waveguide is in accordance with field theory.
    Reason (R) : The system of propagation in transmission lines is in accordance with circuit theory.

68. **Assertion (A) :** Amplitude modulation is wastage of power.
    Reason (R) : Amplitude modulation is wastage of bandwidth.

69. **Assertion (A) :** A number of thyristors operating in parallel cannot share a common heatsink.
    Reason (R) : For simultaneous firing of the thyristor opto-isolator may be employed in the gate driving circuit.

70. **Assertion (A) :** The shift in the position of the bright spot on the CRO screen per unit change of voltage across the deflection plates is called deflection sensitivity.
    Reason (R) : The path traveled by the spot on a CRO screen during the retrace time is called retrace path.

Read the passage and answer the questions **71** to **75** that follow based on your understanding of passage :

General methods of n/w analysis become laborious and time consuming for large and complex network. For such situations the solution is network theorems. Besides, the other features of n/w theorems are

(A) they are applicable to a useful and fairly wide class of networks.

(B) their conclusions are simple and

(C) they sometimes provide good physical insight into the problems.

The maximum power transfer implies that the load impedance must be the complex conjugate of the source impedance. The superposition theorem is valid for any linear, time invariant or time varying. It is useful in circuit analysis when the n/w has large number of sources. Thevenin's or Norton's theorem is applicable to any number of time invariant or time varying n/w. It is useful when only one part of the n/w is varying, while the other part remains constant. Thevenin's equivalent ckt is the voltage source equivalent at the terminals concerned. Millman's theorem is the extension of Thevenin's or Norton's theorem for a number of Current or Voltage sources respectively. The substitution theorem is applicable to any network and can be applied to a branch which is not coupled to other branches of the network. Telleng's theorem is applicable to any lumped n/w regardless of the type of elements, which may be linear or non-linear, time varying or time invariant.

71. The principle of superposition is the property of
    (A) additivity only
    (B) homogeneity only
    (C) combined property of additivity and homogeneity of linear n/w s
    (D) additivity and associativity

72. Which equivalent circuits are dual ?
    (A) Norton-Telleng
    (B) Thevenin-Superposition
    (C) Norton-Thevenin
    (D) Thevenin-Millman

73. In Thevenin equivalent circuit which is incorrect :
    (A) Independent voltage sources are open circuited.
    (B) Independent voltage sources are short circuited.
    (C) Dependent voltage sources are removed.
    (D) Current sources are opened.

74. For the n/w, find R_{TH}

    (A) 2 Ω   (B) 3 Ω
    (C) 4 Ω   (D) 6 Ω
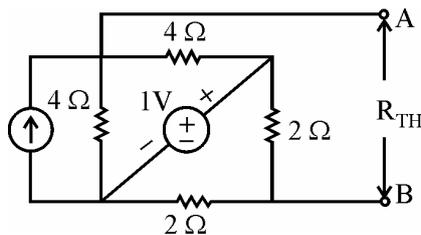
75. Find out which of the following statements is wrong ?
    The principle of superposition is useful for
    (A) linearity test of a system
    (B) substituting sources by their shunt impedances.
    (C) superposition applies to V-I relationship also
    (D) In superposition theorem, response of each source is considered separately.

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Space For Rough Work