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 5

PAPER - II
ELECTRONIC SCIENCE

Time : 1¼ hours] **[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 Test Booklet Number should be entered on the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (1), (2), (3) and (4). You have to darken the circle as indicated below on the correct response against each item.
   Example : ① ② ● ④ where (3) 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 your response 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 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 are no negative marks for incorrect answers.**

परीक्षार्थियों के लिए निर्देश

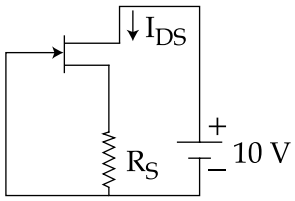
1. इस पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
2. इस प्रश्न-पत्र में पचास बहुविकल्पीय प्रश्न हैं।
3. परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी। पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे, जिसकी जाँच आपको अवश्य करनी है :
   (i) प्रश्न-पुस्तिका खोलने के लिए पुस्तिका 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 का नंबर OMR पत्रक पर अंकित करें और OMR पत्रक का नंबर इस प्रश्न-पुस्तिका पर अंकित कर दें।
4. प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (1), (2), (3) तथा (4) दिये गये हैं। आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है।
   उदाहरण : ① ② ● ④ जबकि (3) 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 चिन्हांकित 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 मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें। हालांकि आप परीक्षा समाप्ति पर मूल प्रश्न-पुस्तिका तथा OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं।
10. **केवल नीले/काले बाल प्वाईंट पेन का ही इस्तेमाल करें।**
11. **किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।**
12. **गलत उत्तरों के लिए कोई नकारात्मक अंक नहीं हैं।**

ELECTRONIC SCIENCE

PAPER - II

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

1. The JFET in a circuit shown in Figure, has an $I_{DSS} = 10$ mA and $V_p = -5V$. The value of resistance R_S for a drain current $I_{DS} = 6.4$ mA is (Choose the nearest value)



(1) 150 Ω (2) 470 Ω (3) 560 Ω (4) 1K Ω

2. As compared to a full-wave rectifier using two diodes, the four diode bridge rectifier has the dominant advantage of :

(1) higher current carrying capacity (2) lower peak inverse voltage requirement

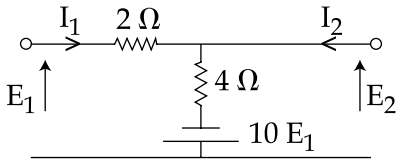
(3) lower ripple factor (4) higher efficiency

3. $\frac{d^2 y}{dt^2} + y = 0$ can be solved using an Operational Amplifier. Which one is preferred ?

(1) OPAMP as an Integrator (2) OPAMP as a Differentiator

(3) OPAMP as an Amplifier (4) None of the above

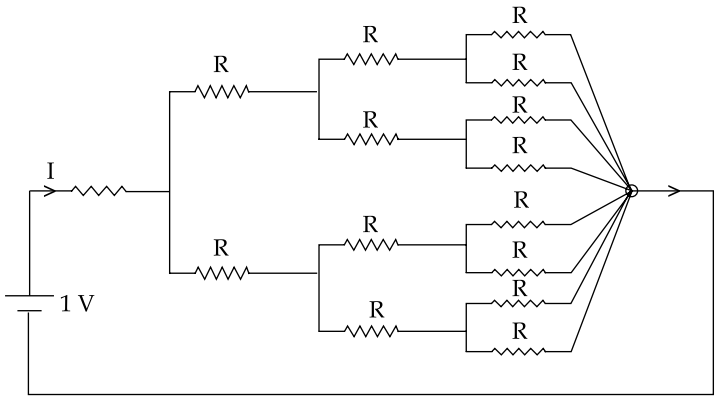
4. The z parameters z_{11} and z_{21} for the 2-port network shown in the given figure respectively are :



(1) $z_{11} = \frac{-6}{11}\ \Omega; z_{21} = \frac{16}{11}\ \Omega$ (2) $z_{11} = \frac{6}{11}\ \Omega; z_{21} = \frac{4}{11}\ \Omega$

(3) $z_{11} = \frac{6}{11}\ \Omega; z_{21} = \frac{-16}{11}\ \Omega$ (4) $z_{11} = \frac{4}{11}\ \Omega; z_{21} = \frac{4}{11}\ \Omega$

5. All the resistances in the figure are 1 Ω each. The value of the current would be :



(1) $\frac{1}{15}$ A (2) $\frac{2}{15}$ A (3) $\frac{4}{15}$ A (4) $\frac{8}{15}$ A

6. Which of the following is **not** a correct variable type in C ?

(1) Float (2) Real (3) int (4) char

7. The conversion time for an 8-bit successive approximation ADC which is driven by 1-MHz clock is :

(1) 3 μs (2) 6 μs (3) 9 μs (4) 12 μs

8. Under which input condition, the J-K Flip-Flop toggles ?

(1) J = 0, K = 0 (2) J = 1, K = 0 (3) J = 0, K = 1 (4) J = 1, K = 1

9. Following sequence of instructions are executed by an 8085 μp :

1000 LXI.SP, 27FF

1003 CALL 1006

1006 POPH.

What will be the contents of SP and HL register pair on completion of execution ?

(1) SP = 27FF, HL = 1003 (2) SP = 27FD, HL = 1003

(3) SP = 27FF, HL = 1006 (4) SP = 27FD, HL = 1006

10. A medium has the value of displacement flux density

$\overline{D} = 20\,xy^2(z+1)\hat{a}_x + 20\,x^2y(z+1)\hat{a}_y + 10\,x^2y^2\,\hat{a}_z$ Coulomb/m^2.

The volume charge density at a point P(0.3, 0.4, 0.5) is given by :

(1) 0.75 c/m^2 (2) 7.5 c/m^2 (3) 12 c/m^2 (4) 0 c/m^2

11. Light emitting diodes fabricated from Ga, As emit radiations in the :

(1) Ultra violet region (2) Visible region

(3) Microwaves (4) Infra - red region

12. An SCR is turned off by :

(1) Reducing the Anode to Cathode Voltage

(2) Removing the gate pulse

(3) Reducing the current below the holding current

(4) Increasing the anode current

13. The approximate rule for transmission of an FM signal generated by a single - tone modulating signal of frequency f_m, modulation index β and maximum frequency deviation Δf, is defined as :

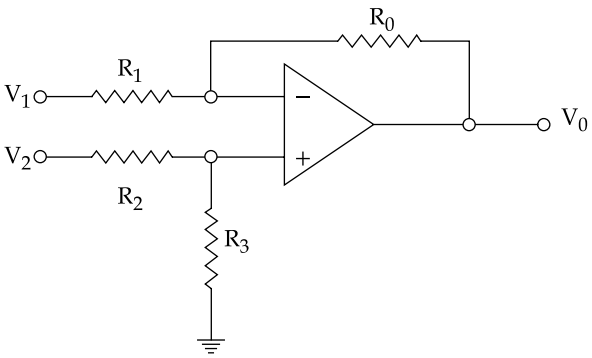
(1) $2\,\Delta f\left(1+\frac{1}{\beta}\right)$ (2) $2\,\Delta f\,(1+\beta)$ (3) $2\,\beta\,(1+\Delta f)$ (4) $2\,f_m\left(1+\frac{1}{\beta}\right)$

14. A fourth order system is characterised by the equation $S^4+8S^3+18S^2+16S+5=0$. This is a :

(1) Stable system (2) Unstable system

(3) Conditionally stable system (4) Marginally stable system

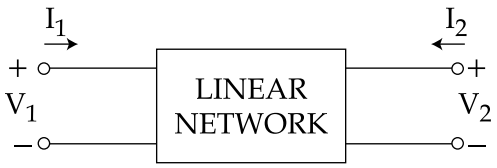
15. An operational amplifier (Op-Amp) circuit shown in the following figure represents :



(1) An inversion circuit (2) An addition circuit

(3) A subtractor circuit (4) A differential amplifier circuit

16. The two port network mentioned below can be characterized by four variables V_1, V_2, I_1 and I_2, in which only two can be



independent. The h-parameters of the two port network possesses the following :

(a) Linear network should contain no independent sources.

(b) V_1 and V_2 are taken as independent variables.

(c) V_1 and I_2 are taken as independent variables.

(d) I_1 and V_2 are taken as independent variables.

Options :

(1) (a) and (b) are correct (2) (a) and (c) are correct

(3) (c) and (d) only are correct (4) (c) only is correct

17. Read the following statements :

(a) Disadvantage of array in 'C' is that it can store only one similar type of data.

(b) Any type of modification on the parameter inside the function will reflect in actual variable value, can be related to call by value.

(c) getch () cannot be used to echo the input.

Which is correct ?

(1) (a) and (b) (2) (a) and (c) (3) (b) and (c) (4) (a), (b) and (c)

18. For the BJT to be biased in its linear or active operating region :

(a) the base - emitter Junction must be forward biased

(b) the base - collector Junction must be reverse biased

(c) the base - emitter Junction must be reverse biased

(d) the base - collector Junction must be forward biased

(1) (a) and (d) are correct (2) (b) and (c) are correct

(3) (a) and (b) are correct (4) (c) and (d) are correct

19. Consider the following statements for a p-n junction diode :

(a) It is an active component

(b) Depletion layer width decreases with forward biasing

(c) In the reverse bias case, saturation current increases with increasing temperature

Which of the statements given above are correct ?

(1) (a), (b), (c) (2) (a) and (b) only

(3) (b) and (c) only (4) (a) and (c) only

20. Consider the following expressions :

(a) $Y = f(A, B, C, D) = \Sigma (1, 2, 4, 7, 8, 11, 13, 14)$

(b) $Y = f(A, B, C, D) = \Sigma (3, 5, 7, 10, 11, 12, 13, 14)$

(c) $Y = f(A, B, C, D) = \pi (0, 3, 5, 6, 9, 10, 12, 15)$

(d) $Y = f(A, B, C, D) = \pi (0, 1, 2, 4, 5, 8, 9, 15)$

Which of the above expressions are equivalent to the expression $Y = A \oplus B \oplus C \oplus D$?

(1) (b) and (c) (2) (a) and (d) (3) (b) and (d) (4) (a) and (c)

21. The following statements are w.r.t 8086 μp :

(a) The width of the address bus for memory referencing is 20 bit

(b) Instruction Pointer (IP) register is an 8 - bit register

(c) There are sin conditional flags and three control flags

Which of them are correct ?

(1) (a) and (b) (2) (a) and (c) (3) (b) and (c) (4) (a), (b) and (c)

22. Consider the following statements regarding Maxwell's equations in differential form (Symbols have their usual meanings) :

(a) For free space $\nabla \times \overline{H} = (\sigma + j\omega\epsilon)\overline{E}$

(b) For free space $\nabla \cdot \overline{D} = \rho$

(c) For steady current $\nabla \times \overline{H} = \bar{J}$

(d) For static electric field $\nabla \cdot \overline{D} = \rho$

Of these statements :

(1) (a) and (b) are correct (2) (b) and (c) are correct

(3) (c) and (d) are correct (4) (a) and (d) are correct

23. In rectifiers :

(a) The efficiency of rectification is given by $\eta = \frac{P_{ac}}{P_{dc}}$

(b) The AC component on the output side : $V_{ac} = \sqrt{V_{rms}^2 - V_{dc}^2}$

(c) Form factor is given by : $FF = \frac{V_{dc}}{V_{rms}}$

(d) Ripple factor is given by : $RF = \sqrt{\left(\frac{V_{rms}}{V_{dc}}\right)^2 - 1}$

Of these statements :

(1) (a) and (d) are correct (2) (b) and (d) are correct

(3) (a) and (c) are correct (4) (c) and (d) are correct

24. The Hartley law states that :

(a) the maximum rate of information depends on the channel bandwidth

(b) the maximum rate of information depends on the depth of modulation

(1) Only (a) is correct (2) Only (b) is correct

(3) Both (a) and (b) are correct (4) Both (a) and (b) are incorrect

25. The error constants are defined in the following manners :

(a) $K_p = G(S), K_v = \underset{s\to 0}{\text{Limit}}\ S^2\ G(S), K_a = \underset{s\to 0}{\text{Limit}}\ S\,G(S)$

(b) $K_p = G(S), K_v = \underset{s\to \infty}{\text{Limit}}\ S\,G(S), K_a = \underset{s\to 0}{\text{Limit}}\ S^2\ G(S)$

(c) $K_p = G(S), K_v = \underset{s\to 0}{\text{Limit}}\ S\,G(S), K_a = \underset{s\to \infty}{\text{Limit}}\ S^2\ G(S)$

(d) $K_p = G(S), K_v = \underset{s\to 0}{\text{Limit}}\ S\,G(S), K_a = \underset{s\to 0}{\text{Limit}}\ S^2\ G(S)$

Which of the above definition(s) is/are correct ?

(1) (a), (b) (2) (a), (c), (d) (3) (a), (b), (d) (4) (d)

26. Match the following :

	List - I		**List - II**
(a)	A/D Convertor	(i)	Impedance Matching
(b)	Emitter Follower	(ii)	VCO
(c)	Schmitt Trigger	(iii)	Successive Approximation
(d)	Phase Locked Loop	(iv)	Hysteresis

Codes :

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(ii)	(iii)	(iv)
(2)	(iii)	(i)	(iv)	(ii)
(3)	(ii)	(iii)	(i)	(iv)
(4)	(iv)	(ii)	(iii)	(i)

27. Match the following :

	List - I		**List - II**
(a)	Lift OFF	(i)	Etching
(b)	Rant's Rule	(ii)	Crystal Growth
(c)	Hydrofluoric acid	(iii)	Packaging
(d)	Float zone	(iv)	Metallisation

Codes :

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(ii)	(iii)	(iv)
(2)	(iv)	(iii)	(i)	(ii)
(3)	(iii)	(ii)	(iv)	(i)
(4)	(ii)	(i)	(iii)	(iv)

28. Match the following :

List - I		**List - II**	
(a)	Superposition Theorem	(i)	Ratio between V and I is constant in different loops
(b)	Maximum Power Transfer Theorem	(ii)	Ideal current source with parallel Resistor
(c)	Norton's Theorem	(iii)	Load impedance is a complex conjugate
(d)	Reciprocity Theorem	(iv)	Not valid to Power of the circuit

Codes :

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(iii)	(ii)	(iv)
(2)	(i)	(iv)	(ii)	(iii)
(3)	(iv)	(iii)	(ii)	(i)
(4)	(ii)	(iii)	(i)	(iv)

29. Match the following :

List - I	**(Operator)**	**List - II**	**(Group)**
(a)	>=	(i)	Assignment operator.
(b)	+ =	(ii)	Unary operator.
(c)	||	(iii)	Relational operator.
(d)	+ +	(iv)	Logical operator.

Codes :

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iv)	(i)	(ii)	(iii)
(2)	(iii)	(i)	(iv)	(ii)
(3)	(ii)	(iii)	(iv)	(i)
(4)	(iii)	(iv)	(ii)	(i)

30. Match the following :

	List - I		**List - II**
(a)	TTL	(i)	Consumer maximum power
(b)	ECL	(ii)	Highest Packaging Density
(c)	NMOS	(iii)	Least power consumption
(d)	CMOS	(iv)	Saturated logic

Codes :

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(iv)	(ii)	(iii)
(2)	(i)	(iv)	(iii)	(ii)
(3)	(iv)	(i)	(ii)	(iii)
(4)	(iv)	(i)	(iii)	(ii)

31. Match the following (w.r.t 8085)

	List - I		**List - II**
(a)	MOV A, B	(i)	Airthmetic group
(b)	INR, M	(ii)	Branch group
(c)	ANA, M	(iii)	Data transfer group
(d)	JNZ, addr	(iv)	Logic instruction

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iii)	(i)	(iv)	(ii)
(2)	(iii)	(iv)	(i)	(ii)
(3)	(iv)	(iii)	(ii)	(i)
(4)	(iv)	(ii)	(i)	(iii)

32. Match the following :

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

Codes :

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iv)	(i)	(ii)	(iii)
(2)	(i)	(iv)	(ii)	(iii)
(3)	(ii)	(i)	(iii)	(iv)
(4)	(iv)	(ii)	(iii)	(i)

33. Match the following :

	List - I		**List - II**
(a)	Chopper	(i)	R-C
(b)	Inverter	(ii)	DC-DC Converter
(c)	SCR	(iii)	PWM
(d)	Snubber Circuit	(iv)	Unidirectional

Codes :

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iii)	(ii)	(iv)	(i)
(2)	(i)	(iii)	(iv)	(ii)
(3)	(ii)	(iii)	(i)	(iv)
(4)	(ii)	(iii)	(iv)	(i)

34. Considering all the symbols with their usual meanings, match the following :

	List - I		**List - II**
(a)	$f_X(x)$	(i)	$\int_{-\infty}^{\infty} f_{X,Y}(x, y)\,dx$
(b)	$\int_{-\infty}^{\infty} f_X(x)\,dx$	(ii)	$\int_{-\infty}^{a} f_X(x)\,dx$
(c)	$F_X(a)$	(iii)	$\int_{-\infty}^{\infty} f_{X,Y}(x,y)\,dy$
(d)	$f_Y(y)$	(iv)	1

Codes :

	(a)	**(b)**	**(c)**	**(d)**
(1)	(ii)	(iii)	(iv)	(i)
(2)	(iii)	(iv)	(i)	(ii)
(3)	(iv)	(ii)	(iii)	(i)
(4)	(iii)	(iv)	(ii)	(i)

35. Considering an underdamped second order instrument, match the following :

	List - I		**List - II**
(a)	Rise Time	(i)	$\exp\left(-\frac{\pi\zeta}{\sqrt{1-\zeta^2}}\right)$
(b)	Peak Time	(ii)	$\frac{\zeta}{2W_n} - \frac{L_n\Delta}{\zeta W_n}$
(c)	Peak Overshoot	(iii)	$\frac{\pi - \cos^{-1}\zeta}{W_n\sqrt{1-\zeta^2}}$
(d)	Settling Time	(iv)	$\frac{\pi}{W_n\sqrt{1-\zeta^2}}$

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(iii)	(ii)	(iv)
(2)	(iii)	(iv)	(i)	(ii)
(3)	(iv)	(ii)	(iii)	(i)
(4)	(ii)	(i)	(iv)	(iii)

Directions : Question No. 36 to 45.

The following items consist of two statements, one labelled as **"Assertion (A)"** and the other labelled as the **"Reason (R)"**. You are to examine the 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 answer to these items using the codes given below and mark your answer accordingly.

Codes :

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

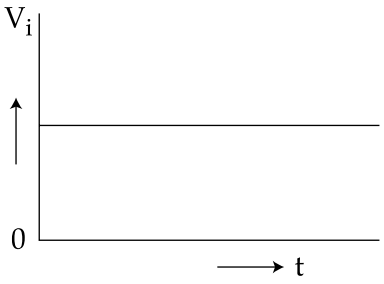
(2) Both **(A)** and **(R)** are true, but **(R)** is not the correct explanation of **(A)**

(3) **(A)** is true, but **(R)** is false

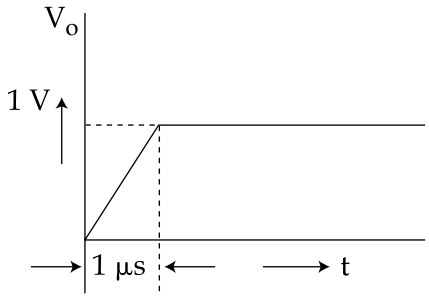
(4) **(A)** is false, but **(R)** is true

36. **Assertion (A) :** The applied input and corresponding output of a OPAMP is shown in Figure below (a) and (b)

(a)



(b)



Reason (R) : Due to slow rate of OPAMP

37. **Assertion (A) :** Two P-N diodes connected back to back cannot be used as a transistor.

Reason (R) : Fabrication of a transistor requires controlled doping of Emitter, base and collector regions.

38. **Assertion (A) :** An enumeration is a data type similar to a structure or a union.

Reason (R) : The members of enumeration data types are variables written as identifiers.

39. **Assertion (A) :** Millman's theorem provides maximum power transfer in a circuit having n - voltage sources each having some internal impedance.

Reason (R) : Because it is a case in which load impedance is the complex conjugate of an equivalent impedance of the network as viewed from the load.

40. **Assertion (A) :** Boolean expressions can be easily simplified using K-map.

Reason (R) : K-map can be drawn for minterms as well as max terms.

41. **Assertion (A) :** In 8085 μp, if source and destination addresses are made implicit, the length of instruction is reduced.

Reason (R) : 8085 has only 3 addressing modes.

42. **Assertion (A) :** Numerical Aperture is a measure of the light collecting ability of a fiber.

Reason (R) : Acceptance angle is referred as the maximum half angle of the cone at which light may enter the fiber in order to propagate within the fiber.

43. **Assertion (A)** : The SWR is a measure of the mismatch between the load and line.

Reason (R) : If the Load is purely reactive, the value of SWR is unity.

44. **Assertion (A) :** Noise figure is defined as the ratio of the signal to noise power at the input terminal to the signal to noise power at the output terminal of the system.

Reason (R) : The noise figure will be less than 1 for an ideal receiver, which introduces no noise of its own.

45. **Assertion (A) :** The state variables of a dynamic system are the largest set of variables that describe the dynamics of the system.

Reason (R) : The state space analysis is a very useful technique for analysing control system.

Read the passage and answer the following questions numbering from 46 to 50.

There are three general purpose microwave tubes. The first is ordinary gridded tube, having electrodes like vacuum tube diode and triodes. The second type are those in which interaction between the electron beam and RF field takes place. The klystron is the example of the second type of microwave tubes. The third category of the device is one in which interaction between an RF field and electron beam is continuous. TWT (Travelling Wave Tube) is the example of this category.

46. A parametric microwave amplifier must be cooled :

(1) because it generates lot of heat

(2) to increase the bandwidth

(3) because it cannot operate at room temperature

(4) to improve the noise performance

47. The frequency of 'K' band is approximately in the range of :

(1) 4 - 6 GHz (2) 8 - 12 GHz (3) 12 - 19 GHz (4) 26 - 32 GHz

48. For best low - level noise performance in the X - band of microwave region, an amplifier should use :

(1) A bipolar transistor (2) A Gunn diode

(3) A step recovery diode (4) An IMPATT diode

49. A parametric amplifier has an input and output frequency of 2.25 GHz and is pumped at 4.5 GHz. It is a :

(1) Travelling wave amplifier (2) Degenerate amplifier

(3) Lower side band up converter (4) Upper side band up converter

50. In the parametric amplifiers, idler frequency is :

(1) double the signal frequency (2) more than > 2fs

(3) $fp \neq 2fs$ (4) $fp < 2fs$

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Space For Rough Work