UGC NET PAPER 3 JANUARY 03, 2017 SHIFT 1 ELECTRONIC SCIENCE QUESTION PAPER

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

1. A conducting line on an IC chip is 2.8 mm long and has a rectangular cross-section of 1 μm × 4 μm. A current of 5 mA produces a voltage drop of 100 mV across the line. If the electron mobility is 500 cm^2/V-s, the electron concentration is

(1) 4.38×10^{21} cm^{-3} (2) 3.5×10^{17} cm^{-3}

(3) 5.48×10^{21} cm^{-3} (4) 4.6×10^{20} cm^{-3}
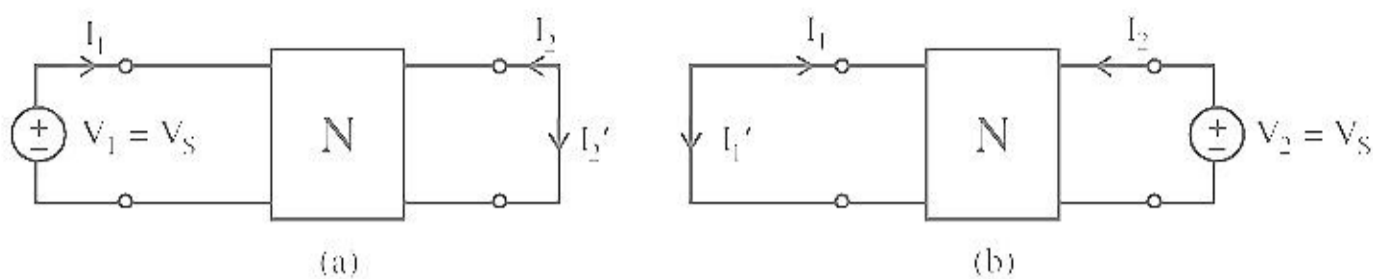
2. In a MOSFET the drain saturation current is

(1) $\dfrac{\mu_0 \text{Cox W}}{L}(V_{gs} - V_{th})$

(2) $\dfrac{\mu_n \text{Cox W}}{2L}(V_{gs} - V_{th})^2$

(3) $\dfrac{\mu_n \text{Cox W}}{2L}(V_{gs} - V_{th}) \, vds$

(4) $\dfrac{\mu_n \text{Cox L}}{W}(V_{gs} - V_{th})^2$

3. The time constant for the network shown below will be :
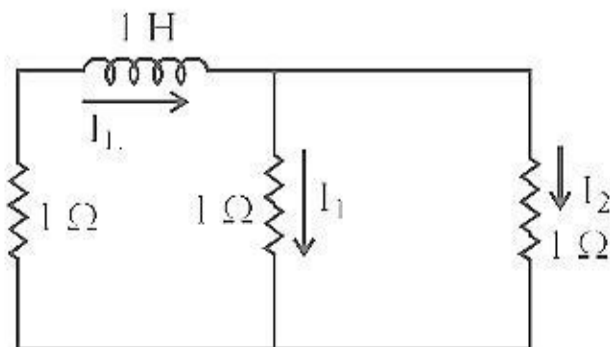
(1) $\dfrac{1}{3}$ sec (2) $\dfrac{2}{3}$ sec

(3) 1 sec (4) 3 sec

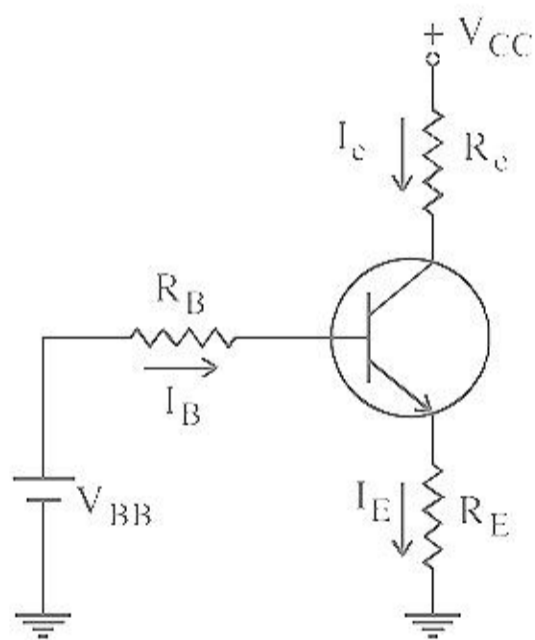**4.** Consider the networks shown in the following figures (a) and (b) :

(a)   (b)

The above networks are :

(1)   Thevenin's equivalent of each other

(2)   Dual network of each other

(3)   Reciprocal network of each other

(4)   They are symmetrical to each other

5. In a circuit given below the base current I_B is

(1) $\dfrac{V_{BB}}{R_B}$

(2) $\dfrac{V_{BB} - V_{BE}}{R_B + R_E}$

(3) $\dfrac{V_{BB} - V_{BE}}{R_B + (\beta + 1) R_E}$

(4) $\dfrac{V_{BB}}{R_B + (\beta + 1) R_E}$

6. In a class A large signal amplifier with R_L as a load resistance, I_m and V_m represents the peak sinusoidal current and voltage, the output power is

(1) $\dfrac{(V_{max} - V_{min}) (I_{max} - I_{min})}{2\sqrt{2}}$

(2) $\dfrac{(V_{max} - V_{min}) (I_{max} - I_{min})}{8}$

(3) $\dfrac{V_m \cdot I_m}{\sqrt{2}}$

(4) $\dfrac{(V_{max} - V_{min}) (I_{max} - I_{min})}{2}$

7. In a 4 bit ripple counter and a 4 bit synchronous counter are made using flip-flops having a propagation delay of 10 ns each. If the worst case delay in the ripple counter and the synchronous counter be 'R' & 'S' respectively, then the value of 'R' & 'S' is given by :

(1) R = 10 ns, S = 40 ns   (2) R = 40 ns, S = 10 ns

(3) R = 10 ns, S = 30 ns   (4) R = 30 ns, S = 10 ns

8. The Boolean expression $AC + B\overline{C}$ is equivalent to :

(1) $\overline{A}C + B\overline{C} + AC$ (2) $\overline{B}C + AC + B\overline{C} + \overline{A}C\overline{B}$

(3) $AC + B\overline{C} + \overline{B}C + ABC$ (4) $ABC + \overline{A}B\overline{C} + AB\overline{C} + A\overline{B}C$

9. For pushing of flags and popping of flags in 8086, the instructions are :

(1) Push and Pop   (2) Push F and Pop F

(3) Push and Pop F   (4) None of the above

10. Consider the following set of 8085 instructions :

MVI A, 8EH

ADI 73H

JC DSPLY

OUT PORT1

HLT

DSPLY : XR A

OUT PORT1

HLT

The output at PORT1 is :

(1) FEH   (2) 01H

(3) 00   (4) 11H

11. Which of the following cannot be a member of a structure in 'C' ?

(1) Enumeration   (2) Another structure

(3) Function   (4) Array

12. For which of the following declarations in 'C', "NEXT ++;" code will fail ?

    (1) # define NEXT 85.5   (2) char *NEXT = "A";

    (3) float NEXT = 85.5   (4) None of the above

13. In a loss less transmission line of length 50 cm with L = 10 µH/m, C = 40 pF/m is operated at 25 MHz. Its electrical path length is

    (1) 0.5 metres   (2) λ metres

    (3) $\pi/2$ radian   (4) 180 degrees

14. A TRAPATT diode has the doping concentration NA = 2×10^{15}/cm^3 and a current density of 20 kA/cm^2. The value of avalanche zone velocity is given by :

    (1) 6.25×10^9 cm/s   (2) 6.25×10^7 cm/s

    (3) 6.25×10^8 m/s   (4) 6.25×10^3 cm/s

15. The Hilbert transform of $\cos \omega_1 t + \sin \omega_2 t$ is

    (1) $\sin \omega_1 t + \sin \omega_2 t$ (2) $\cos \omega_1 t + \sin \omega_2 t$

    (3) $\sin \omega_1 t + \cos \omega_2 t$ (4) $\cos \omega_1 t + \cos \omega_2 t$

16. When optimum filter becomes a matched filter and noise is white, the probability of error is given by

    (1) $P_e = \frac{1}{2} \text{erfc} \left[\frac{E_S}{4\eta} \right]^{\frac{1}{2}}$
    (2) $P_e = \frac{1}{2} \text{erfc} \left[\frac{E_S}{\eta} \right]^{\frac{1}{2}}$

    (3) $P_e = \frac{1}{2} \text{erfc} \left[0.6 \frac{E_S}{\eta} \right]^{\frac{1}{2}}$
    (4) $P_e = \frac{1}{2} \text{erfc} \left[\frac{E_S}{2\eta} \right]^{\frac{1}{2}}$

17. Which of the following conditions is applicable in semiconductor LASERS ?

    (1) $E_{FC} - E_{FV} = E_g$ (2) $E_{FC} - E_{FV} > E_g$

    (3) $E_{FC} - E_{FV} < E_g$ (4) $E_{FC} - E_{FV} = 2E_g$

18. A channel with bit rate R_b = 36 Kbps is available for PCM voice transmission. Find the sampling rate f_s, assuming f_m = 3.2 kHz.

(1)   7.2 MHz   (2)   3.6 MHz

(3)   3.6 kHz   (4)   7.2 kHz

19. The fundamental law that is used in temperature measurement is known as

(1)   First law of thermodynamics   (2)   Second law of thermodynamics

(3)   Third law of thermodynamics   (4)   Zeroth law of thermodynamics

20. The location of closed loop poles of a LTI system is given as shown in the figure :
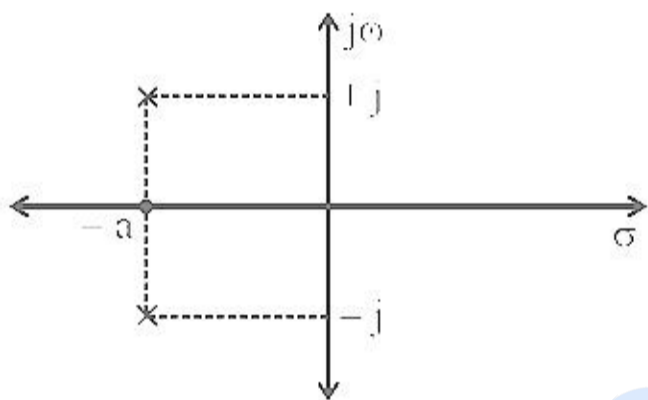
The system will be

(1)   Unstable   (2)   Marginally stable

(3)   Absolutely stable   (4)   Relatively stable

21. For non-degenerate semiconductors the product of the majority and minority carrier concentration is fixed as

(a) ni^2 (b) $Nc\ Nv\ exp\left(\dfrac{Eg}{kT}\right)$

(c) $Nc\ Nv\ exp\left(-\dfrac{Eg}{kT}\right)$ (d) $Nv\ exp\left(-\dfrac{Eg}{kT}\right)$

Which of the above are correct ?

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

(3)   (b) is correct, but (a) is wrong.   (4)   (a) and (d) are correct.

22. In a BJT the collector current in common emitter configuration is

(1) $\alpha I_E + I_{CBO}$ (2) $\alpha I_E + I_{CEO}$

(3) $\beta I_B + I_{CBO}$ (4) $\beta I_B + I_{CEO}$

23. Consider the following RLC circuit and read the statements given below :
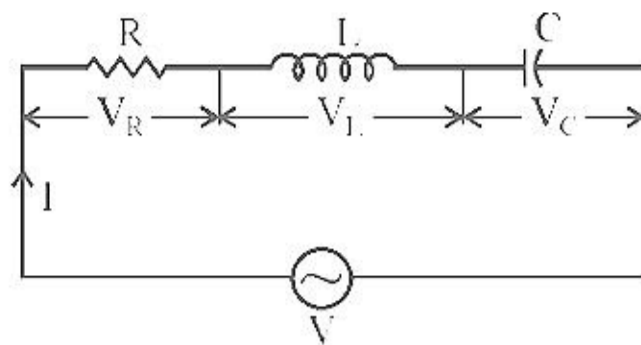
    (a)   The current I is in phase with V_R.

    (b)   The current I leads V_C by $\pi/2$.

    (c)   The current I lags behind V_L by $\pi/2$.

    (d)   The current I leads V_L by $\pi/2$.

Which of the above statements are correct ?

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

    (3)   Only (a), (b) and (d) are correct.   (4)   Only (a), (b) and (c) are correct.

24. In a common emitter transistor amplifier the current gain can be expressed as

    (a) $\dfrac{-\,hfe}{hoe}$ (b) $\dfrac{-\,hfe}{1 + hoe\;R_L}$

    (c) $\dfrac{hfe}{1 - hoe\;R_L}$ (d) $\dfrac{-\,hfe}{1 - hoeR_L}$

Options :

    (1)   (a) is correct, but (b) is wrong.   (2)   (b) and (d) are correct.

    (3)   (b) is correct, but (d) is wrong.   (4)   (c) and (d) are correct.

25. Read the following statements regarding complexity of a network :

    (a)   The order of complexity of a network is defined as the number of independent initial conditions that can be specified in a network.

    (b)   The number of state equations that can be written for a network is equal to the order of the complexity of the network.

    (c)   The order of complexity is always more than the number of energy storing elements.

    (d)   The number of state equations that can be written for a network is always higher than the number of energy storing elements.

Which of the above statements are correct ?

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

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

26. In a rectifier the ripple factor can be expressed as

(a) $\dfrac{I_{rms}}{I_{dc}}$

(b) $\sqrt{\dfrac{I_{dc}}{I_{rms}}}$

(c) $\sqrt{\left(\dfrac{I_{rms}}{I_{dc}}\right)^2 - 1}$

(d) $\sqrt{1 - \left(\dfrac{I_{rms}}{I_{dc}}\right)^2}$

Which one of the above is correct ?

(1) (a) and (b) are correct.

(2) (a) is wrong, but (c) is correct.

(3) (d) is correct, but (c) is wrong.

(4) (c) and (d) are correct.

27. For a three state TTL following statements are given :

(a) It allows to connect outputs directly.

(b) It allows to connect the inputs directly.

(c) It is used to decrease the switching time.

(d) It is used to increase the switching time in order to interface the peripherals for matching the speed with computer.

Which of the above are correct ?

(1) (a) & (d)

(2) (a) and (c)

(3) (b) & (c)

(4) (b) & (d)

28. For A to D converters, following statements are given :

(a) It is the process of converting time varying input to discrete output levels.

(b) Flash type A/D conversion are slow in nature.

(c) The quantisation error depends upon the step size of quantisation.

(d) Flash type A/D conversion is a simultaneous conversion.

Which of the above are correct ?

(1) (a), (b) & (c)

(2) (a), (c) & (d)

(3) (a) and (b) only

(4) (b), (d) & (c) only

29. Consider the following registers :

(a)   A and B registers   (b)   B and C registers

(c)   D and E registers   (d)   H and L registers

Which of these 8-bit registers of 8085 microprocessor can be paired together to make a 16 bit register ?

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

(3)   (b), (c) and (d)   (4)   (b), (d) and (a)

30. Consider the following instructions of 8085 microprocessor :

(a)   MOV M, A   (b)   ADD C

(c)   MVI A, FF   (d)   CMP M

Which of these cause change in the status of flag(s) ?

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

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

31. Which of the following functions manipulate the value of file position indicator ?

(a)   ftell( )   (b)   fgetpos( )

(c)   rewind( )   (d)   fgetc( )

Codes :

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

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

32. Which of the following statements are correct about the C declarations given below ?

          char *p = "Honesty";

          char a[ ] = "Honesty";

(a)   There is no difference in the declarations and both serve the same purpose.

(b)   In both cases the '\o' will be added at the end of the string "Honesty".

(c)   The first statement is incorrect since '\o' is not given in the string.

(d)   'p' is a non-const pointer pointing to a non-const string, whereas 'a' is a const pointer pointing to a non-const string.

Codes :

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

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

33. Following statements are given :

    (a) Beam width between first nulls for a broadside long array is given by $\simeq \dfrac{2\lambda}{nd}$.

    (b) Beam width between first nulls for an end fire long array is given by $\simeq 2 \cdot \sqrt{\dfrac{2\lambda}{nd}}$.

    (c) Beam width between first nulls for a broadside long array is given by $\simeq \sqrt{\dfrac{\lambda}{nd}}$.

    (d) Beam width between first nulls for an end fire long array is given by $\simeq \dfrac{\lambda}{nd}$.

    Which of the above statements are correct ?

    (1) (a) & (b)   (2) (b) & (c)

    (3) (c) & (d)   (4) (d) & (a)

34. Helical antenna is used for satellite tracking because of

    (a) the circular polarisation

    (b) the good front to back ratio

    (c) the Tropo scatter

    (d) the Faraday effect

    Which of the above are correct ?

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

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

35. Which of the following statements are correct ?

    (a) Large carrier AM signal are detected by using square law detectors.

    (b) Low level modulated signal (~ below IV) are detected by square law detectors.

    (c) Ratio detector is sensitive to amplitude variations therefore must be preceded by amplitude limiter circuit.

    (d) A Foster-Seeley discriminator circuit converts the frequency deviation of the FM wave into original intelligence signal.

    Options :

    (1) (a) & (c) are correct.   (2) (b) & (d) are correct.

    (3) (a), (c) & (d) are correct.   (4) (b), (c) & (d) are correct.

36. Which of the following statements are correct ?

    (a) In CDMA, the entire bandwidth can be used all the time.

    (b) TDMA is a technique which does not allow for spectrum re-un i.e. utilizing same spectrum in different time slots.

    (c) TDMA has primary disadvantage of susceptibility for station cross-linking.

    (d) FDMA is the simplest & most basic format Multiple Access Communications.

    Options :

    (1) (b) & (c) are correct.   (2) (a), (c) & (d) are correct.

    (3) (a) & (d) are correct.   (4) (c) & (d) are correct.

37. Which of the following statements are correct in case of Light Emitting Diodes ?

    (a) Homojunctions LEDs are often surface emitters.

    (b) Heterojunctions LEDs are Edge emitters.

    (c) Heterojunction LEDs are often surface emitters.

    (d) LEDs provide monochromatic & coherent radiations.

    Options :

    (1) (a) & (b) are correct.   (2) (a) & (c) are correct.

    (3) (a), (b) & (d) are correct.   (4) (a), (c) & (d) are correct.

38. Which of the following statements are incorrect in case of semiconductor LASERs ?

    (a) Stimulated emission rate dominates the spontaneous emission with increase in the value of energy of radiation per unit volume per unit frequency.

    (b) Stimulated emission rate dominates the absorption rate of the charge carriers in the ground state are higher than the excited state.

    (c) LASERs have a longer life-line than LEDs.

    (d) LASER diodes are more temperature sensitive than LEDs.

    Options :

    (1) (c) & (d) are incorrect.   (2) (a), (c) and (d) are incorrect.

    (3) (a) & (d) are incorrect.   (4) (b) & (c) are incorrect.

39. Read the following statements regarding biomedical instrumentations :

(a) Sphygmos is used for blood pressure measurement.

(b) EMG represents a record of the electrical activity of the brain.

(c) ERG represents the record of potential from the retina.

(d) ECG represents the record of electrical activity of brain.

Which of the above statements are correct ?

(1) (a) and (b) are correct.

(2) (b) and (c) are correct.

(3) (a) and (c) are correct.

(4) (b) and (d) are correct.

40. Read the following statements regarding PID controller :

(a) The system complexity of a PID controller is less than that of a PI controller.

(b) A PID controller produces no action for any constant error signal.

(c) A PID controller is used to increase the damping factor of the dominant poles of a PI controlled system.

(d) A PID controller is used to decrease the damping factor of the dominant poles of a PI controlled system.

Which of the above statements are correct ?

(1) (a) and (b)

(2) (b) and (c)

(3) (a) and (d)

(4) (b) and (d)

41. Match the following lists :

List – I		List – II
a.	Abrupt p-n junction	i.
b.	Linearly graded p-n junction	ii.
c.	Tunnel diode	iii.
d.	p-i-n diode	iv.

List – II:

i. | p⁺ | n⁺ |

ii. | p⁺ | n | n⁺ |

iii. | p | π(v) | n |

iv. | p⁺ | p | n | n⁺ |

Correct codes are :

Codes :

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

42. Match the following lists :

	List – I		List – II
a.	Negative real and simple roots	i.	Sustained oscillatory
b.	Negative real and equal roots	ii.	Overdamped
c.	Complex conjugate roots	iii.	Critically damped
d.	Imaginary conjugate roots	iv.	Underdamped

Correct codes are :

Codes :

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

43. Match the following lists :

List – I	
a. Voltage doubler	i.
b. Halfwave rectifier	ii.
c. Positive clamping circuit	iii.
d. Negative clamping circuit	iv.
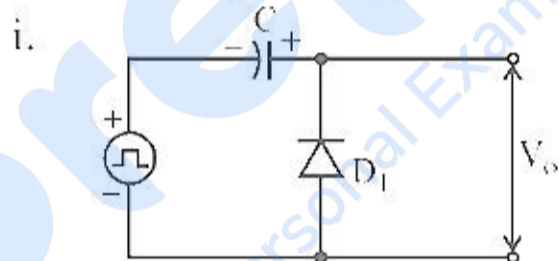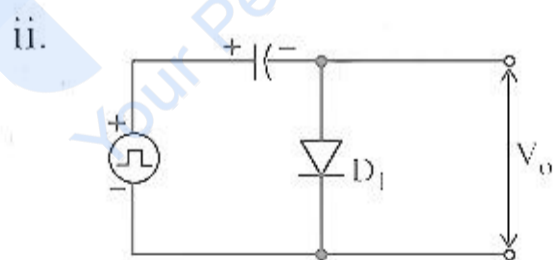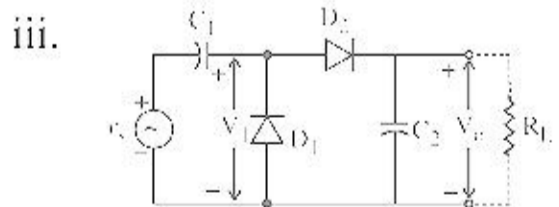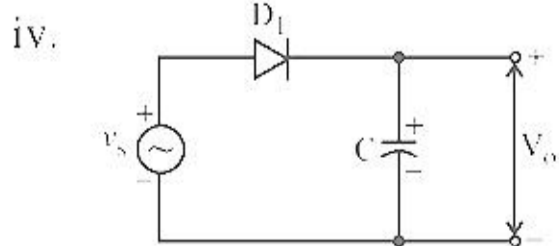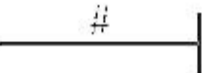
Codes :

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

44. Match the following lists in terms of qualifying symbols for inputs and outputs :

	List – I		List – II
a.		i.	Non-logic connection
b.		ii.	Input for digital signals
c.		iii.	Logic negation at the input
d.		iv.	Active low input

Correct codes are :

Codes :

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

45. Match the following lists in 8085 :

	List – I		List – II
	Interrupt		**Vector Address**
a.	RST 7.5	i.	0034H
b.	RST 6.5	ii.	0024H
c.	RST 5.5	iii.	003CH
d.	TRAP	iv.	002CH

Codes :

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

46. Match the items of List-I in C++ with the items of List-II in FORTRAN :

	List – I		List – II
a.	Global variables	i.	Computed GOTO
b.	Static	ii.	EQUIVALENCE
c.	Reference	iii.	COMMON
d.	Switch	iv.	SAVE

Codes :

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

47. Match the following lists :

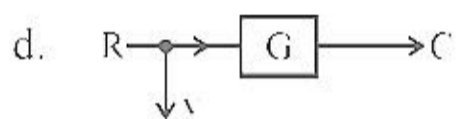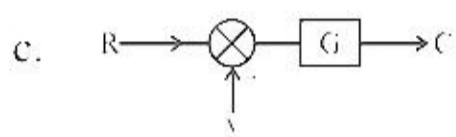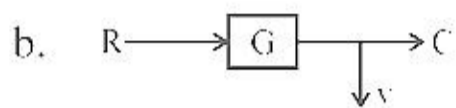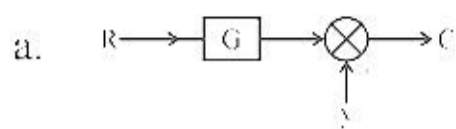|	List – I		List – II
a.	Beam efficiency	i.	$4\pi/\Omega A$
b.	Directivity	ii.	kD
c.	Gain	iii.	$\dfrac{\Omega_M}{\Omega_A}$
d.	Aperture Efficiency	iv.	A_e/A_p

Correct Codes are :

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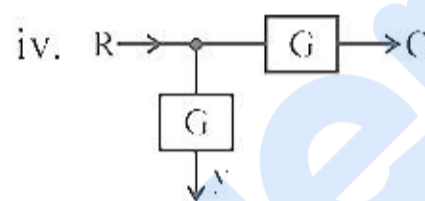
	a	b	c	d
(1)	iii	i	iv	ii
(2)	iv	i	ii	iii
(3)	iii	i	ii	iv
(4)	ii	iv	i	iii

48. Match the following lists :

	List – I		List – II
a.	Power efficient transmission of signals	i.	AM
b.	Bandwidth efficient transmission of signals with significant dc signals	ii.	VSB
c.	Most bandwidth efficient transmission of voice signals	iii.	SSB-SC
d.	Simplest Receiver Circuit	iv.	FM

Correct Codes are :

Codes :

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

49. Match the following lists :

|	List – I		List – II
a.	SCR can be turned off by	i.	it turns off when anode current falls below this value.
b.	Turn on time of SCR can be reduced by	ii.	the rectangular pulse of high amplitude and narrow width
c.	Holding current for an SCR means	iii.	its anode current interruption
d.	A forward current can be applied to an SCR after	iv.	its gate recovery time

Correct Codes are :

Codes :

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

50. Match the following lists :

	List – I		List – II
a.		i.	
b.		ii.	
c.		iii.	
d.		iv.	
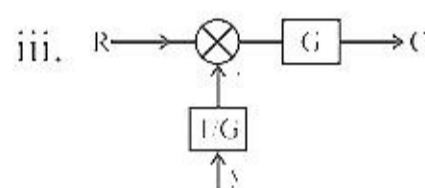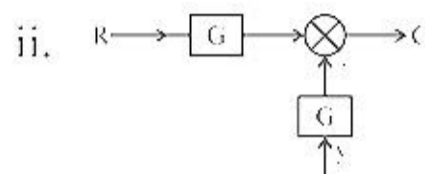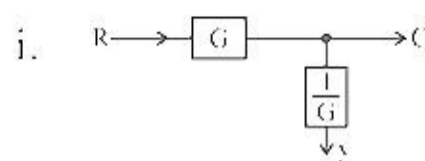
Codes :

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

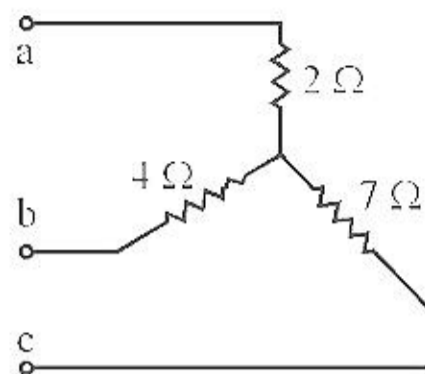**51.** Arrange the following materials in ascending order based on their mobility of electrons at 300 K :

(a)　Germanium　　　　　　　　　(b)　Silicon

(c)　Gallium Arsenide　　　　　　　(d)　Gallium Nitride

Codes :

(1)　(a)　(b)　(c)　(d)

(2)　(b)　(c)　(d)　(a)

(3)　(d)　(b)　(a)　(c)

(4)　(c)　(d)　(b)　(a)

52. Consider a star network as shown in the following figure :

If the resistance between terminals b and c with a open is represent by R_A, the resistance between c and a with b open is R_B and the resistance between a and b with c open is R_C, then arrange R_A, R_B and R_C in descending order.

(1) R_C, R_B, R_A (2) R_B, R_C, R_A

(3) R_A, R_B, R_C (4) R_B, R_A, R_C

53. Arrange the following fabrication steps in order needed to fabricate the IC :

(a)   Oxidation   (b)   Etching

(c)   Metallization   (d)   Epitaxial growth

Codes :

(1)   (a)   (b)   (c)   (d)

(2)   (d)   (a)   (b)   (c)

(3)   (b)   (c)   (d)   (a)

(4)   (c)   (d)   (a)   (b)

54. For TTL operation in low and high states at the output different voltages are required :

(a) $V_{IL,\ max}$ (b) $V_{IH,\ min}$

(c) $V_{OL,\ max}$ (d) $V_{OH,\ min}$

Arrange the above in ascending order of voltages, the correct code is given by :

Codes :

(1)   (c)   (a)   (b)   (d)

(2)   (b)   (a)   (c)   (d)

(3)   (a)   (b)   (c)   (d)

(4)   (d)   (b)   (a)   (c)

55. Arrange the following in descending order w.r.t. their pin numbers of 8251 USART :

(a) CLK   (b) $\overline{DTR}$

(c) $\overline{CTS}$ (d) $\overline{CS}$

Codes :

(1)   (d)   (c)   (a)   (b)

(2)   (c)   (b)   (d)   (a)

(3)   (a)   (d)   (b)   (c)

(4)   (b)   (a)   (c)   (d)

56. Arrange the following in 'C' in the order they can appear logically in a graphics related program :

(a)   restorecrtmode( )

(b)   initgraph( )

(c)   DETECT

(d)   closegraph( )

The correct order of sequence is :

Codes :

(1)   (a)   (d)   (b)   (c)

(2)   (c)   (b)   (d)   (a)

(3)   (b)   (a)   (c)   (d)

(4)   (d)   (c)   (a)   (b)

57. Following are microwave bands :

(a)   Ka

(b)   L

(c)   C

(d)   X

Arrange them in descending order of frequencies :

Codes :

(1)   (a)   (b)   (c)   (d)

(2)   (b)   (d)   (c)   (a)

(3)   (a)   (d)   (c)   (b)

(4)   (a)   (c)   (d)   (b)

58. Arrange in order of the increasing Bandwidth value for the below mentioned systems :

(a)   DSB-SC   (b)   VSB

(c)   FM   (d)   SSB

Codes :

(1)   (d)   (a)   (b)   (c)

(2)   (b)   (d)   (a)   (c)

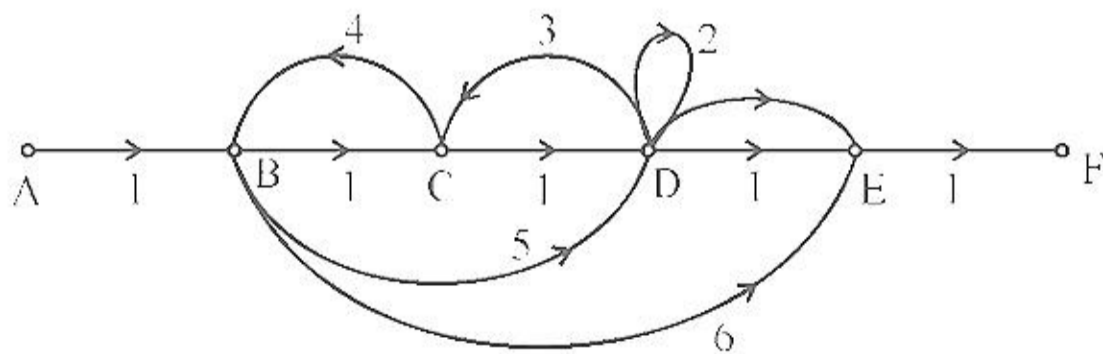(3)   (c)   (a)   (b)   (d)

(4)   (d)   (b)   (a)   (c)

59. Arrange the below mentioned III-V materials to produce LEDs in order of their increasing emission wavelengths :

(a)   In AS   (b)   Si C

(c)   Ga P   (d)   Ga AS

Codes :

(1)   (c)   (d)   (b)   (a)

(2)   (b)   (c)   (d)   (a)

(3)   (a)   (b)   (c)   (d)

(4)   (b)   (a)   (c)   (d)

60. Consider the following signal flow graph given in the figure :

Let

A.   is no. of forward paths

B.   is no. of total loops

C.   is no. of non-touching loop

Arrange above in increasing orders of their values :

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

(3)   B, C, A   (4)   C, B, A

Directions : Question Nos. **61 – 70 :**

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.

61. **Assertion (A) :** In a bipolar IC fabrication, the diode isolation is used to isolate one device from the other.

    Reason (R) : P^+n diode used as isolation diode in IC fabrication.

62. **Assertion (A) :** It is convenient to write loop equations for a network containing voltage source but no current source.

    Reason (R) : If the current sources are present, then these must be first converted into their equivalent voltage sources.

63. **Assertion (A) :** The Gunn diode characteristics shows the region of negative resistance.

    Reason (R) : The Gunn diode is made of n-type and p-type degenerate semiconductor.

64. **Assertion (A) :** Asynchronous sequential circuit is also called event driven circuit.

    Reason (R) : Event driven circuit does not have clock to trigger change of state. The states are changed by the change in input signal of the previous stage.

65. **Assertion (A) :** A low $\overline{WR}$ means a write operation and a low $\overline{RD}$ means a read operation.

    Reason (R) : $\overline{WR}$ and $\overline{RD}$ both cannot be low at the same time.

66. **Assertion (A) :** In 'C', structures cannot be compared using relational operators = = and ! =.

    Reason (R) : A field by field comparison might require unacceptable amounts of repetitive code for large structures. Pointer fields may also cause problems.

67. **Assertion (A) :** Curl of any vector is a vector. It gives normal vector which is perpendicular to both the plane and the parent vector.

    Reason (R) : The value of curl $\vec{H}$ can be found by the following expression :

    $$(\text{Curl } \bar{H})_{Normal} = \lim_{\Delta S \to 0} \frac{\oint \bar{H} \times \bar{dl}}{\Delta S}$$

    Where, ΔS is the planar area, $\bar{dl}$ is line element.

68. **Assertion (A) :** The kind of radio receiver best suited to have the sensitivity and selectivity to fully reproduce the modulating signal at its output is known as superheterodyne receivers.

    Reason (R) : The transmitted signal at the receiver end becomes very weak due to noise and further it had to share the free space with thousands of other signal and may have to travel a distance.

69. **Assertion (A) :** Those semiconductor materials that practically no thermally generated current carriers at room temperature are used as photoconductors.

    Reason (R) : These materials are essentially insulators in the dark and carriers generated by the absorption of light cause maximum possible change in the resistivity of the cell.

70. **Assertion (A) :** According to Routh-Hurwitz criterion, the system represented by characteristic equation F(S) will be unstable, if the first column of the array contains no sign change.

    Reason (R) : If any row of the Routh's table is multiplied or divided by a positive integer, then the system stability will not be affected.

Now-a-days, electronic measuring instruments are required for all the applications like industrial, medical, biomedical, Aerospace, etc. They are based upon basic principles of measuring resistance, temperature, pH, viscosity, pressure, humidity, etc. They are based on transducers, which convert physical quantity into electrical quantity, which are later on measured and calibrated.

71. The pH value of a solution having a hydrogen ion concentration of 2.3×10^{11} g/litre is :

(1) Strong acidic in nature   (2) Alkaline in nature

(3) Neutral   (4) Slightly acidic

72. The reference electrode in pH measurement is

(1) Glass electrode   (2) Hydrogen electrode

(3) Antimony electrode   (4) Hg-Calomel electrode

73. ECG represents :

(1) the rhythmic curve of depolarisation and repolarisation of the myocardium, the heart muscle.

(2) the wave form of the voltage produced in the heart muscle due to an externally applied electrical stimulus.

(3) the record of electrical currents flowing in the cardiac muscle.

(4) the record of intensity of heart sounds at different intervals sensed by an electro-acoustic sensor.

74. Optical pyrometers are used to measure :

(1) High intensity   (2) Low temperatures

(3) High temperatures   (4) Light intensity & high temperatures

75. Which of the following is a positive displacement device ?

(1) Rotameter   (2) Sliding vane flow meter

(3) Turbine flow meter   (4) Volumetric tank

Space For Rough Work