



Paper : II

Subject : ELECTRONIC SCIENCE

Subject Code : 31

Roll No. [] [] [] [] [] [] [] []

(Figures as per admission card)

OMR Sheet No. : _____

BOOKLET SERIAL NO.

Name & Signature of Invigilator/s

Signature : _____

Name : _____

Time : 2 Hours

Maximum Marks : 200

Number of Pages in this Booklet : 24

Number of Questions in this Booklet : 100

ಅಭ್ಯರ್ಥಿಗಳಿಗೆ ಸೂಚನೆಗಳು

- ಈ ಪುಟದ ಮೇಲ್ಭಾಗದಲ್ಲಿ ಒದಗಿಸಿದ ಸ್ಥಳದಲ್ಲಿ ನಿಮ್ಮ ರೋಲ್ ನಂಬರನ್ನು ಬರೆಯಿರಿ.
- ಈ ಪತ್ರಿಕೆಯು ಬಹು ಆಯ್ಕೆ ವಿಧದ ನೂರು (100) ಪ್ರಶ್ನೆಗಳನ್ನು ಒಳಗೊಂಡಿದೆ.
- ಪರೀಕ್ಷೆಯ ಪ್ರಾರಂಭದಲ್ಲಿ ಪ್ರಶ್ನೆ ಪುಸ್ತಿಕೆಯನ್ನು ನಿಮಗೆ ನೀಡಲಾಗುವುದು. ಮೊದಲ 5 ನಿಮಿಷಗಳಲ್ಲಿ ನೀವು ಪುಸ್ತಿಕೆಯನ್ನು ತೆರೆಯಲು ಮತ್ತು ಕೆಳಗಿನಂತೆ ಕಡ್ಡಾಯವಾಗಿ ಪರೀಕ್ಷಿಸಲು ಕೋರಲಾಗಿದೆ.
 - ಪ್ರಶ್ನೆಪುಸ್ತಿಕೆಗೆ ಪ್ರವೇಶವನ್ನು ಪಡೆಯಲು, ಈ ಹೊದಿಕೆ ಪುಟದ ಅಂಚಿನ ಮೇಲಿರುವ ಪೇಪರ್ ಸೀಲನ್ನು ಹರಿಯಿರಿ. ಸ್ವಿಕ್ಟರ್ ಸೀಲ್ ಇಲ್ಲದ ಅಥವಾ ತೆರೆದ ಪುಸ್ತಿಕೆಯನ್ನು ಸ್ವೀಕರಿಸಬೇಡಿ.
 - ಪುಸ್ತಿಕೆಯಲ್ಲಿನ ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ ಮತ್ತು ಪುಟಗಳ ಸಂಖ್ಯೆಯನ್ನು ಮುಖಪುಟದ ಮೇಲೆ ಮುದ್ರಿಸಿದ ಮಾಹಿತಿಯೊಂದಿಗೆ ತಾಳಿ ನೋಡಿರಿ. ಪುಟಗಳು/ಪ್ರಶ್ನೆಗಳು ಕಾಣೆಯಾದ ಅಥವಾ ದ್ವಿಪ್ರತಿ ಅಥವಾ ಅನುಕ್ರಮವಾಗಿದ್ದು ಅಥವಾ ಇತರ ಯಾವುದೇ ವ್ಯತ್ಯಾಸದ ದೋಷಪೂರಿತ ಪುಸ್ತಿಕೆಯನ್ನು ಕೂಡಲೆ 5 ನಿಮಿಷದ ಅವಧಿ ಒಳಗೆ, ಸಂವೀಕ್ಷಕರಿಂದ ಸರಿ ಇರುವ ಪುಸ್ತಿಕೆಗೆ ಬದಲಾಯಿಸಿಕೊಳ್ಳಬೇಕು. ಆ ಬಳಿಕ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ಬದಲಾಯಿಸಲಾಗುವುದಿಲ್ಲ, ಯಾವುದೇ ಹೆಚ್ಚು ಸಮಯವನ್ನೂ ಕೊಡಲಾಗುವುದಿಲ್ಲ.
- ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಗೂ (A), (B), (C) ಮತ್ತು (D) ಎಂದು ಗುರುತಿಸಿದ ನಾಲ್ಕು ಪರ್ಯಾಯ ಉತ್ತರಗಳಿವೆ. ನೀವು ಪ್ರಶ್ನೆಯ ಎದುರು ಸರಿಯಾದ ಉತ್ತರದ ಮೇಲೆ, ಕೆಳಗೆ ಕಾಣಿಸಿದಂತೆ ಅಂಡಾಕೃತಿಯನ್ನು ಕಪ್ಪಾಗಿಸಬೇಕು.

ಉದಾಹರಣೆ : (A) (B) (C) (D)

(C) ಸರಿಯಾದ ಉತ್ತರವಾಗಿದ್ದಾಗ.
- ಈ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯ ಜೊತೆಯಲ್ಲಿ ಕೊಟ್ಟಿರುವ OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ನಿಮ್ಮ ಉತ್ತರಗಳನ್ನು ಸೂಚಿಸತಕ್ಕದ್ದು. OMR ಹಾಳೆಯಲ್ಲಿ ಅಂಡಾಕೃತಿಯಿಲ್ಲದ ಬೇರೆ ಯಾವುದೇ ಸ್ಥಳದಲ್ಲಿ ಉತ್ತರವನ್ನು ಗುರುತಿಸಿದರೆ, ಅದರ ಮೌಲ್ಯಮಾಪನ ಮಾಡಲಾಗುವುದಿಲ್ಲ.
- OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಕೊಟ್ಟ ಸೂಚನೆಗಳನ್ನು ಜಾಗರೂಕತೆಯಿಂದ ಓದಿರಿ.
- ಎಲ್ಲಾ ಕರಡು ಕೆಲಸವನ್ನು ಪುಸ್ತಿಕೆಯ ಕೊನೆಯಲ್ಲಿ ಮಾಡತಕ್ಕದ್ದು.
- ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಬಹುದಾದ ನಿಮ್ಮ ಹೆಸರು ಅಥವಾ ಯಾವುದೇ ಚಿಹ್ನೆಯನ್ನು, ಸಂಗತವಾದ ಸ್ಥಳ ಹೊರತು ಪಡಿಸಿ, OMR ಉತ್ತರ ಹಾಳೆಯ ಯಾವುದೇ ಭಾಗದಲ್ಲಿ ಬರೆದರೆ, ನೀವು ಅನರ್ಹತೆಗೆ ಬಾಧ್ಯರಾಗುತ್ತೀರಿ.
- ಪರೀಕ್ಷೆಯು ಮುಗಿದನಂತರ, ಕಡ್ಡಾಯವಾಗಿ OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ಸಂವೀಕ್ಷಕರಿಗೆ ನೀವು ಹಿಂತಿರುಗಿಸಬೇಕು ಮತ್ತು ಪರೀಕ್ಷಾ ಕೊಠಡಿಯ ಹೊರಗೆ OMRನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ಕೊಂಡೊಯ್ಯಕೂಡದು.
- ಪರೀಕ್ಷೆಯ ನಂತರ, ಪರೀಕ್ಷಾ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ಮತ್ತು ನಕಲು OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಬಹುದು.
- ನೀಲಿ/ಕಪ್ಪು ಬಾಲ್‌ಪಾಯಿಂಟ್ ಪೆನ್ ಮಾತ್ರವೇ ಉಪಯೋಗಿಸಿರಿ.
- ಕ್ಯಾಲ್ಕುಲೇಟರ್, ಎದ್ದುನಾಣ ಉಪಕರಣ ಅಥವಾ ಲಾಗ್ ಟೇಬಲ್ ಇತ್ಯಾದಿಯ ಉಪಯೋಗವನ್ನು ನಿಷೇಧಿಸಲಾಗಿದೆ.
- ಸರಿ ಅಲ್ಲದ ಉತ್ತರಗಳಿಗೆ ಋಣ ಅಂಕ ಇರುವುದಿಲ್ಲ.
- ಕನ್ನಡ ಮತ್ತು ಇಂಗ್ಲೀಷ್ ಆವೃತ್ತಿಗಳ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಗಳಲ್ಲಿ ಯಾವುದೇ ರೀತಿಯ ವ್ಯತ್ಯಾಸಗಳ ಕಂಡುಬಂದಲ್ಲಿ, ಇಂಗ್ಲೀಷ್ ಆವೃತ್ತಿಗಳಲ್ಲಿರುವುದೇ ಅಂತಿಮವೆಂದು ಪರಿಗಣಿಸಬೇಕು.

Instructions for the Candidates

- Write your roll number in the space provided on the top of this page.
- This paper consists of Hundred multiple-choice type of questions.
- 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 :
 - To have access to the Question Booklet, tear off the paper seal on the edge of the cover page. Do not accept a booklet without sticker seal or open booklet.
 - 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.
- Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.

Example : (A) (B) (C) (D)

where (C) is the correct response.
- Your responses to the questions are to be indicated in the OMR Sheet kept inside this Booklet. If you mark at any place other than in the circles in the OMR Sheet, it will not be evaluated.
- Read the instructions given in OMR carefully.
- Rough Work is to be done in the end of this booklet.
- If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
- You have to return the OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must NOT carry it with you outside the Examination Hall.
- You can take away question booklet and carbon copy of OMR Answer Sheet after the examination.
- Use only Blue/Black Ball point pen.
- Use of any calculator, electronic gadgets or log table etc., is prohibited.
- There is no negative marks for incorrect answers.
- In case of any discrepancy found in the Kannada translation of a question booklet the question in English version shall be taken as final.



ELECTRONIC SCIENCE
Paper – II

Note : This paper contains **Hundred (100)** objective type questions. **Each** question carries **two (2)** marks. **All** questions are **compulsory**.

1. Which of the following material is class II-VI compound ?

- (A) AlAs (B) GaN
(C) CdS (D) InP

2. Which of the following compound will have highest break down voltage ?

- (A) GaP (B) GaAs
(C) Si (D) Ge

3. Intrinsic electron concentration in a semiconductor is given by

- (A) $n_i = N_c e^{-(E_c - E_i)/kT}$
(B) $n_i = N_c e^{(E_c - E_i)/kT}$
(C) $n_i = N_c / e^{(E_c + E_i)/kT}$
(D) $n_i = E_c E_i / N_c e^{-(E_c - E_i)/kT}$

Where N_c is effective density of states, E_c is energy level of conduction band and E_i is average energy.

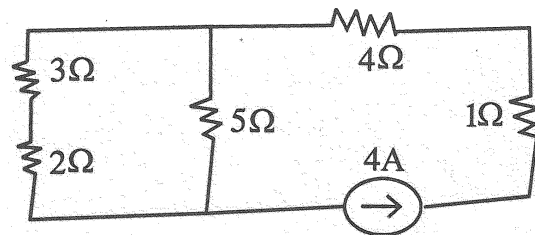
4. Because of _____, TEM cannot be used to study live cells.

- (A) high vacuum
(B) high temperature
(C) high humidity
(D) high energy X-rays

5. nMOS devices are formed in a

- (A) n-substrate with heavy doping level
(B) n-substrate with moderate doping level
(C) p-substrate with heavy doping level
(D) p-substrate with moderate doping level

6. In the circuit given below, the power dissipated by the 3 ohm resistor is



- (A) 2 W (B) 4 W
(C) 8 W (D) 12 W

7. If the Laplace transform of a function

is $F(s) = \frac{1}{s+2}$, then its initial value is

- (A) 0
(B) $\left(\frac{1}{2}\right)$
(C) 1
(D) 2



8. An FIR filter has M -zeros outside the unit circle in the z -plane, then the largest possible phase change that the system can introduce is
- (A) $M\pi$ (B) $\left(\frac{M\pi}{2}\right)$
(C) $\left(\frac{2\pi}{M}\right)$ (D) $2M\pi$
9. What is the efficiency of series fed class 'A' amplifier ?
- (A) 25% (B) 50%
(C) 78.5% (D) Above 90%
10. The charge amplifiers are normally used for amplifying signals from
- (A) Photo transistor
(B) Piezoelectric transducer
(C) Hall effect devices
(D) Optical encoders
11. Advanced Schottky is a part of
- (A) ECL family (B) CMOS family
(C) TTL family (D) FET family
12. Positive logic in a circuit is one in which :
- (A) Logic 0 and 1 are represented by 0 and positive voltage respectively
(B) Logic 0 and -1 are represented by negative and positive voltage respectively
(C) Logic 0 voltage level is higher than logic 1 voltage level
(D) Logic 0 voltage level is lower than logic 1 voltage level
13. The physical address of the data in a look-up table is found by XLAT instruction of 8086 microprocessor by adding the contents of
- (A) DS, AL, BX
(B) AL, BX
(C) AX, BX
(D) DS, AX, BX
14. Signal on ALE pin of 8086 microprocessor is high means
- (A) Multiplexed address/data bus contains address information
(B) Multiplexed address/data bus contains data information
(C) Lower 16 lines of multiplexed address/data bus contains address information and remaining 4 lines contains status information
(D) Lower 16 lines of multiplexed address/data bus contains data information and remaining 4 lines contains status information



15. The step involved in PUSH operation of 8051 microcontroller is
- (A) Increment stack by 2 and store 16 bit content to address pointed to by SP
 - (B) Decrement stack by 1 and store 8 bit content to address pointed to by SP
 - (C) Increment stack by 1 and store 8 bit content to address pointed to by SP
 - (D) Store 8 bit content to address pointed to by SP and then increment stack by 1
16. A directional coupler with 3 or more holes is preferred to two pole coupler.
- (A) To reduce spurious mode generation
 - (B) To increase coupling of the signal
 - (C) Because it is more efficient
 - (D) To increase the bandwidth of the system
17. If transmission bandwidth is doubled in FM, SNR is
- (A) Doubled
 - (B) Raised by four times
 - (C) Decreased by four times
 - (D) Halved
18. Which of the following step is not included in the process of reception ?
- (A) Encoding
 - (B) Decoding
 - (C) Storage
 - (D) Interpretation
19. In AM if carrier of 100 percent modulated wave is suppressed, the percentage power saving will be
- (A) 50
 - (B) 66.66
 - (C) 150
 - (D) 100
20. How many roots of the given characteristic equation are/is in RHS of S-plane $s^3 - 4s^2 + s + 6 = 0$?
- (A) 0
 - (B) 2
 - (C) 3
 - (D) 4
21. A second order system subjected to a step input has a response whose maximum overshoot is 50%. Then the system may be said to be
- (A) Overdamped
 - (B) Critically damped
 - (C) Underdamped
 - (D) Undamped
22. For a string voltage of 3300 V, let there be six series connected SCRs each of voltage 600 V. Then the string efficiency is
- (A) 91.7%
 - (B) 96%
 - (C) 98.54%
 - (D) 99.36%



23. Dual slope integrator DVM eliminates following

- (A) Quantum noise
- (B) Ramp voltage error
- (C) Step size error
- (D) Speed limitation

24. A pulse wave is 'ac' coupled to an oscilloscope with $R_i = 10 \text{ M}\Omega$ and $C_c = 0.1 \mu\text{F}$, what is the longest pulse width (or space width) that can be displayed without noticeable low-frequency distortion being introduced by oscilloscope ?

- (A) 10 ms (B) 30 ms
- (C) 75 ms (D) 100 ms

25. The reference level control in a spectrum analyser is used to adjust the amplitude of a main signal (or reference signal) to

- (A) Fill the screen vertically
- (B) Adjust the centre frequency
- (C) Normalize the range of frequency
- (D) Synchronize with tracking generator

26. Following materials can be used for making a LED

- a) GaAs b) GeInSb
- c) AlSi d) InGaN

Codes :

- (A) a, c
- (B) a, b
- (C) a, c, d
- (D) a, d

27. Following are the active sources

- a) Fluorescent lamp
- b) L C D
- c) L E D
- d) Silicon diode

Codes :

- (A) c
- (B) b, c
- (C) a, c
- (D) b, c, d

28. Which of the following statements are true ?

- a) Bipolar transistors are not used in BiCMOS circuits
- b) Bipolar transistors have superior transconductance characteristics than MOS transistors
- c) The current per unit area characteristics of MOS transistors are superior than Bipolar transistors
- d) The Bipolar transistors have better switching performance than MOS transistors

Codes :

- (A) a and c are true
- (B) a and d are true
- (C) b and c are true
- (D) b and d are true



29. Which of the following statements are true for XRD ?

- a) It is not suitable for the physical characterization of liquids
- b) It is not suitable for the physical characterization of polymers
- c) In the XRD plot, the x-axis represents angle
- d) In the XRD plot, the x-axis represents distance

Codes :

- (A) b and c are true
- (B) a and c are true
- (C) a and d are true
- (D) b and d are true

30. For an even and half-wave symmetry function, the Fourier coefficients are

- a) $a_0 = 0$ b) $a_n = 0$
- c) $b_n = 0$ d) $a_0 \neq 0$

Codes :

- (A) a and b are true
- (B) a and c are true
- (C) b and c are true
- (D) c and d are true

31. Which of the following statements are true with respect to the FIR systems ?

- a) The systems have finite impulse response
- b) The systems have infinite impulse response
- c) The systems are recursive
- d) The systems are non-recursive

Codes :

- (A) a and c are true
- (B) b and c are true
- (C) b and d are true
- (D) a and d are true

32. Following are the ideal characteristics of op-amp

- a) High output impedance
- b) High open loop gain
- c) High input bias current
- d) High slew rate

Which of the above statements are true ?

Codes :

- (A) d
- (B) b, c
- (C) b, d
- (D) b, c, d



33. Thermal shut down in a IC regulated power supply is initiated by following components

- a) External pass transistor
- b) A Zener diode
- c) Current sense resistor
- d) Error amplifier

Codes :

- (A) b
- (B) a, b, d
- (C) a, b, c
- (D) b, c, d

34. Following are Boolean properties

- a) $x + y = y + x$
- b) $xy = yx$
- c) $x + (yz) = (x + y) (x + z)$
- d) $x (y + z) = xy + xz$

Which of the above are commutative properties ?

Codes :

- (A) c and d
- (B) a and b
- (C) a and c
- (D) b and d

35. Simplification of equation $V = f(a, b, c, d) = \sum (2, 3, 4, 5, 13, 15) + \sum d (8, 9, 10, 11)$ is given below, where 'd' is don't care

- a) $v = b'c + ad$
- b) $v = b'c + ad + a' b c'$
- c) $v = b'c + a'd$
- d) $v = b'c' + ad$

Which of the above is true ?

Codes :

- (A) a and c
- (B) b only
- (C) a and d
- (D) d only

36. Which of the following statements is/are true with respect to TEST pin of 8086 microprocessor ?

- a) If low, execution continues else microprocessor is in wait state
- b) If high, execution continues else microprocessor is in wait state
- c) It is used to test the status of co-processor
- d) It is used to test the status of memory

Codes :

- (A) a
- (B) a and c
- (C) a and d
- (D) b and d



37. Which of the following register of 8051 microcontroller can be addressed as a byte only ?

- a) PCON b) TMOD
- c) IE d) TCON

Codes :

- (A) a, b and c
- (B) a and c
- (C) c and d
- (D) a and b

38. Consider the following statements for a square waveguide of cross section $3\text{ m} \times 3\text{ m}$, it has been found that

- a) at 6 GHz dominant mode will propagate
- b) at 6 GHz all the modes are evanescent
- c) at 11 GHz only dominant modes and no higher order mode will propagate
- d) at 7 GHz degenerate modes will propagate

Which of the above statements are correct ?

Codes :

- (A) a and b
- (B) a, b and d
- (C) b and c
- (D) b, c and d

39. Consider the following features

- a) Wider bandwidth due to higher frequencies
- b) Smaller component size leading to smaller systems
- c) Existence of low signal losses
- d) Lower interference due to lower signal crowding

Which of these advantages are present in RF/Microwave system applications :

Codes :

- (A) b, c and d
- (B) a, c and d
- (C) a, b and d
- (D) a, b and c

40. Consider the following statements

- a) Spectral density express average power in a waveform as a function of frequency
- b) Role of channel in communication system is mixing of signals
- c) For providing two or more voice circuits on same carrier we use DSB – SC
- d) Notch filter is a band stop filter

Codes :

- (A) a and d
- (B) a and b
- (C) b and c
- (D) b and d



41. Consider the following statements
- a) Forward error correction code corrects error without retransmission of signal
 - b) Read solomon codes are non-binary
 - c) A feedback decoder makes a hard-decision
 - d) Maximum distance is related to the error correcting capability of the codes

Choose the correct answer from above :

Codes :

- (A) b and c
- (B) a and c
- (C) a and b
- (D) b and d

42. A minimum phase transfer function
- a) Does not have poles or zeros in the right half of S-plane
 - b) Does not have poles or zeros on the $j\omega$ -axis, excluding the origin
 - c) Does not have poles or zeros in the left-half of S-plane
 - d) Does have poles or zeros on the $j\omega$ -axis

Codes :

- (A) a and d
- (B) a and b
- (C) c and d
- (D) b and c

43. The speed of a motor from stator side, can be controlled by
- a) Changing the supply frequency
 - b) Changing the supply voltage
 - c) Inserting resistance in rotor circuit
 - d) Various ways of cascade connection

Codes :

- (A) a and b
- (B) c and d
- (C) a, b and c
- (D) a and d

44. Consider the following statements associated with electrical/electronic transducers
- a) Mass-inertia effects are minimised
 - b) These transducers consume very little power
 - c) The response time is large
 - d) Transmission and processing the signal for the purpose of measurement are easier

Which of the above are correct for electrical/electronic transducers ?

Codes :

- (A) a, b and c
- (B) b, c and d
- (C) a, c and d
- (D) a, b and d



45. Piezoelectric transducer are used in following medical application

- a) Muscle contraction
- b) Grip force
- c) Heart wall motion
- d) Finger contact pressure

Codes :

- (A) a, c
- (B) a, d
- (C) a, b, d
- (D) b, c, d

46. Match the following :

List – I

List – II

- | | |
|------------------|--------------------------|
| a. LED | i. Indirect bandgap |
| b. Silicon Diode | ii. Passive device |
| c. Candle | iii. Current injection |
| d. LCD | iv. Spontaneous emission |

Codes :

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

47. Match the following compound for their emission color

List – I

List – II

- | | |
|------------|----------|
| a. InGaN | i. Green |
| b. GaP : N | ii. IR |
| c. GaAs | iii. Red |
| d. AlGaAs | iv. Blue |

Codes :

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

48. Match List – I (Layer information in nMOS design) with List – II (stick diagram color coding)

List – I

List – II

- | | |
|-----------------|------------|
| a. N-diffusion | i. Red |
| b. Polysilicon | ii. Green |
| c. Implant | iii. Black |
| d. Contact area | iv. Yellow |

Codes :

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



49. Match List - I (Required fabrication process) with List - II (Suitable fabrication process)

List - I

- a. Annealing
- b. Metalization
- c. SiO₂
- d. Epitaxy

List - II

- i. Physical vapor deposition
- ii. Oxidation
- iii. Chemical vapor deposition
- iv. Rapid thermal processing

Codes :

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

50. Match List - I (Network theorems) with List - II (Salient features of theorems)

List - I

- a. Superposition theorem
- b. Thevenin's theorem
- c. Norton's theorem
- d. Maximum power transfer theorem

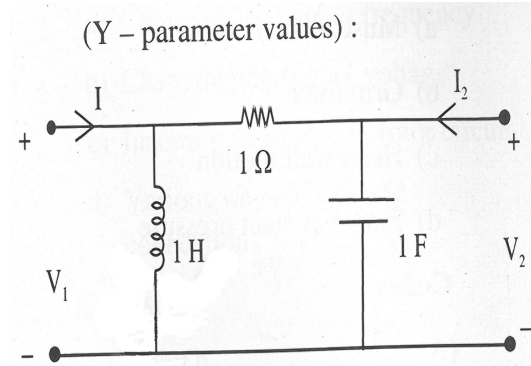
List - II

- i. Open-circuited voltage source
- ii. Short-circuited current source
- iii. Scaling and additive property
- iv. Power delivered to load

Codes :

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

51. For the network shown below, match List - I (Y - parameters) with List - II



List - I

- a. Y₁₁
- b. Y₁₂
- c. Y₂₂ + Y₂₁
- d. Y₂₂

List - II

- i. s + 1
- ii. - 1
- iii. 1 + 1/s
- iv. s

Codes :

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



52. Match the following :

List – I	List – II
a. Class A amplifier	i. Non-linear distortion
b. Class C amplifier	ii. Cross over distortion
c. Class B amplifier	iii. Low distortion
d. Class AB amplifier	iv. Low power

Codes :

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

53. Match the following :

List – I	List – II
a. CMRR	i. 6 dB/decade
b. Roll-off	ii. 120 dB
c. Open-loop gain	iii. 0.5 V/ μ s
d. Slew rate	iv. 20,000

Codes :

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

54. Match the following :

List – I	List – II
a. In multiple synchronous sequential elements	i. due to different logic path
b. In multiple synchronous sequential elements	ii. skew present problem
c. Skew in clock occurs while distribution	iii. at low clock speed skew rarely is trouble some
d. When sequential elements operates at maximum clock frequency	iv. skew refers to phase shift between rectangular clock waveform

Codes :

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



55. Match the following :

List – I

a. Excitation table is a

b. State table is a

c. Transition table is a

d. State diagram is a

List – II

i. State variable changes that occurs as a sequential circuit change states

ii. Tabular representation of the state changes that occurs in sequential circuits

iii. Table that specifies the excitation values for each state variable

iv. Graphical representation of the interaction of state transition under different input conditions

Codes :

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

56. Match the following 8086 instructions with R/M bits of instruction template.

List – I

a. MOV AL, [BX]

b. MOV AL, [BX + DI]

c. MOV AL, [BX + SI + 5678H]

d. MOV AL, [FA64H]

List – II

i. 000

ii. 001

iii. 110

iv. 111

Codes :

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

57. Match the following lists with respect to registers and their address in 8051 micro controller.

List – I

a. IP

b. PSW

c. A

d. PO

List – II

i. 80H

ii. B8H

iii. DOH

iv. EOH

Codes :

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



58. Match the following :

List – I

- a. Cavity wave meter
- b. Magic Tee
- c. VSWR
- d. Magnetron

List – II

- i. Microwave component
- ii. Microwave source
- iii. Microwave frequency measurement
- iv. Reflection coefficient measurement

Codes :

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

59. Match the following :

List – I

- a. Directional coupler
- b. Rectangular waveguide
- c. Magnetron
- d. Reciprocity theorem

List – II

- i. Improvement of stability and efficiency is achieved by strapping
- ii. Detect the presence of both forward and backward waves in a waveguide
- iii. TE_{10}
- iv. Antenna measurements

Codes :

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



60. Match the following :

List – I	List – II
a. Cross talk	i. Reduce scattering loss
b. Immune to RFI	ii. Optical fibre
c. Cladding	iii. Copper cable
d. Elastic plastic material	iv. Mechanical isolation

Codes :

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

61. Match the following :

List – I	List – II
a. Shot noise	i. ambient light
b. Dark noise	ii. leakage current
c. Surface dark noise	iii. statistical nature
d. Amplifier noise	iv. minimum as possible

Codes :

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

62. Match the following lists :

List – I	List – II
a. $L\{f(t-a)u(t-a)\}$	i. $F_1(s) F_2(s)$
b. $L\left\{\int_0^t f_1(\tau) f_2(t-\tau)d\tau\right\}$	ii. $F(s+a)$
c. $L\{f_1(t) \cdot f_2(t)\}$	iii. $e^{-as} F(s)$
d. $L\{f(t) e^{-at}\}$	iv. $F_1(s) * F_2(s)$

Codes :

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

63. Match the following :

List – I	List – II
a. Thyristor	i. High speed application
b. MOSFET	ii. Small on-state drop
c. IGBT	iii. Slow devices
d. BJT	iv. Large on-state drop

Codes :

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



64. Match the following :

List – I

- a. Piezoelectric transducer
- b. Strain gauge
- c. Thermo couple
- d. Photo transistor

List – II

- i. Passive device
- ii. Voltage source
- iii. Current device
- iv. Built in amplification

Codes :

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

65. Match the following transducers :

List – I

- a. Hot wire
- b. Venturi
- c. Turbine
- d. Electromagnetic

List – II

- i. Dialysate flow in artificial kidney
- ii. Blood flow in arteries
- iii. Respiratory gas flow
- iv. Blood flow in lung-heart machines

Codes :

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

66. Following are the materials, arrange the resistivity of these materials in increasing order

- a) Bakelite
- b) Mica
- c) Pure silica
- d) Window glass

Codes :

- (A) a, d, b, c
- (B) c, b, d, a
- (C) a, b, c, d
- (D) c, a, b, d

67. The sequence of steps used in the fabrication of gate structure in nMOS transistor is

- a) Thin oxide deposition
- b) Polysilicon deposition
- c) Photoresist deposition and etching
- d) Thick oxide deposition on p-substrate

Codes :

- (A) a, c, d, b
- (B) b, d, c, a
- (C) d, c, a, b
- (D) a, b, c, d



68. The order in which the following processes are used in analog-to-digital conversion system is

- a) Coding
- b) Sampling
- c) Prefiltering
- d) Quantization

Codes :

- (A) b, a, c, d
- (B) a, d, b, c
- (C) c, d, a, b
- (D) c, b, d, a

69. Following are different types of voltage regulators

- a) Emitter follower
- b) Zener diode
- c) Op-amp regulator
- d) 3-pin IC

Arrange them in the increasing order of load regulation.

Codes :

- (A) b, a, c, d
- (B) b, a, d, c
- (C) a, b, d, c
- (D) a, b, c, d

70. Arrange the various stages in case of FPGA in order of data propagation from input to output

- a) Pull up stage
- b) Input/output block
- c) Switching matrix
- d) Configurable logic block

Codes :

- (A) b, c, a, d
- (B) b, c, d, a
- (C) a, b, c, d
- (D) a, b, d, c

71. Arrange the following flags of 8086 microprocessor in the order of their appearance in flag register from MSB to LSB

- a) Overflow flag
- b) Trap flag
- c) Direction flag
- d) Interrupt flag

Codes :

- (A) a, b, d, c
- (B) b, c, d, a
- (C) b, d, c, a
- (D) a, c, d, b



72. Following are modulation

- a) FM
- b) 100% AM
- c) 10% AM
- d) 50% AM

Arrange the power input to Antenna in increasing order.

Codes :

- (A) a, c, d, b
- (B) b, d, c, a
- (C) a, d, c, b
- (D) b, c, d, a

73. Consider the following :

- a) F D M
- b) T D M
- c) O F D M
- d) O A M

Arrange above terms in order of bandwidth efficiency and spectral efficiency.

Codes :

- (A) b, a, d, c
- (B) b, a, c, d
- (C) a, b, c, d
- (D) a, b, d, c

74. Arrange the following in the order of appearance in SMPS of mobile phone charger from input to output

- a) High frequency rectifier
- b) Switching transistor
- c) Transformer
- d) High voltage rectifier

Codes :

- (A) a, b, c, d
- (B) d, b, c, a
- (C) a, c, b, d
- (D) d, b, a, c

75. Arrange the following blocks in the order of their signal flow in a spectrum analyser

- a) Detector
- b) Verticle amplifier
- c) IF amplifier
- d) Mixer

Codes :

- (A) d, c, a, b
- (B) a, c, d, b
- (C) c, a, b, d
- (D) d, a, c, b



Directions : Questions 76 to 95.

The following items consist of two statements, one labelled as “**Assertion (A)**” and the other labelled as “**Reason (R)**”. You have 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 :

- (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 the correct explanation of (A)
- (C) (A) is true, but (R) is false
- (D) (A) is false, but (R) is true

76. Assertion (A) : An N-type semiconductor behaves as an intrinsic semiconductor at very high temperature.

Reason (R) : The breaking of the covalent bonds becomes a significant phenomenon at high temperature.

77. Assertion (A) : JFET has high input resistance.

Reason (R) : In pinch-off region, drain current becomes constant.

78. Assertion (A) : In P-well CMOS circuit, deep P-well diffusion is created.

Reason (R) : Deep P-well is used in P-well CMOS to achieve higher threshold voltage.

79. Assertion (A) : Ion implantation is a useful alternative to high temperature diffusion.

Reason (R) : The advantage of ion implantation is that it can be carried out at low temperature without disturbing previous diffusion region.

80. Assertion (A) : Z-parameters can be used to test the reciprocity property of two-port network.

Reason (R) : A two-port network is said to be reciprocal if the 2-parameters of the network satisfy the condition $Z_{11} = Z_{22}$.



81. Assertion (A) : Maximum power transfer theorem is used to find the power delivered to the load of the network.

Reason (R) : Maximum power is delivered to the load if the load resistance value is equal to the 50% of the source resistance value.

82. Assertion (A) : Instrumentation amplifier have very high CMRR.

Reason (R) : Instrumentation amplifier has two identical op-amps at input in non-inverting mode.

83. Assertion (A) : A simple low pass filter can be used as integrator.

Reason (R) : Combination of RC gives linear characteristic for the integrator.

84. Assertion (A) : Under parallel types A/D conversion, a flash convertors, the input is simultaneously compared with various reference voltages which are one LSB apart.

Reason (R) : Characteristics of flash convertors is very low speed conversion is possible. Since the speed is only limited by switching time of the comparators and gates.

85. Assertion (A) : In DTL circuit output stage does not exhibit a low, constant output impedance in both logic states.

Reason (R) : In DTL when output transistor is saturated, the output impedance is low and when output transistor is cut-off, the output impedance is parallel equivalent of the pull-up resistor.

86. Assertion (A) : CISC architecture gives more emphasis on Hardware.

Reason (R) : CISC processor contains complex instructions with variable length.

87. Assertion (A) : Microcontroller application requires the counting of external events or the generation of precise internal time delay.

Reason (R) : 8051 microcontroller is having two timer/counters.

88. Assertion (A) : Electromagnetic oscillations are sustained in a two-cavity Klystron due to feedback of output power to the input cavity in proper phase.

Reason (R) : Two-cavity Klystron is the most suitable microwave source at laboratory to generate local oscillations for frequency measurements.



- 89. Assertion (A) :** GaAs uses transferred electron effect for production of Microwaves.
- Reason (R) :** Gun diode has the negative resistance characteristic.
- 90. Assertion (A) :** Stimulated emission gives rise to light amplification in LASER cavity.
- Reason (R) :** Metastable energy state in material cavity gives rise to stimulated emission.
- 91. Assertion (A) :** Plastic fibers are used in short distance application.
- Reason (R) :** Plastic fibers offers substantially lower attenuation than glass fibers.
- 92. Assertion (A) :** Stability of a system deteriorates when integral control is incorporated in it.
- Reason (R) :** With integral control action order of the system increases and higher the order of the system, the more the system tends to become unstable.

- 93. Assertion (A) :** Snubber circuit has an RC series circuit in parallel with SCR.
- Reason (R) :** Voltage across a capacitor can not change instantaneously.
- 94. Assertion (A) :** Potentiometers cannot be used as error detectors in position control systems.
- Reason (R) :** The number of turns of a potentiometer places an upper limit on its accuracy.
- 95. Assertion (A) :** Load cell is a compound transducer.
- Reason (R) :** Strain gauge is used in load cell.

Based on the following paragraph answer Q. No. **96-100**.

The Fourier transform is used for the frequency analysis of discrete-time aperiodic finite energy signals. But the Fourier transform of a discrete-time aperiodic signal is a continuous function of frequency and it is not computationally convenient representation. To overcome this problem, frequency domain sampling of Fourier transform is carried out.



The sampled version of the Fourier transform of a periodic discrete-time signal is called the Discrete Fourier Transform (DFT). DFT plays an important role in the implementation of many signal processing algorithms. The DFT satisfies many important properties like linearity, periodicity etc. The Inverse Discrete Fourier Transform (IDFT) is used to transform the signal from frequency domain to time domain.

96. The Fourier transform $X(\omega)$ of an aperiodic sequence $x(n)$ is given by

(A) $X(\omega) = \sum_{n=-\infty}^{\infty} x(n)e^{-j\omega n}$

(B) $X(\omega) = \frac{1}{2\pi} \sum_{n=-\infty}^{\infty} x(n)e^{-j\omega n}$

(C) $X(\omega) = \sum_{n=0}^{N-1} x(n)e^{-j\omega n}$

(D) $X(\omega) = \frac{1}{2\pi} \sum_{n=0}^{N-1} x(n)e^{-j\omega n}$

97. The IDFT of

$$X(k) = \{6, -2 + j2, -2, -2 - j2\}$$
 is

(A) $\{2, 3, 4, 1\}$

(B) $\{2, 6, 0, 2\}$

(C) $\{0, 1, 2, 3\}$

(D) $\{3, 6, 2, 1\}$

98. The DFT of a real and even signal is

(A) Real and odd

(B) Real and even

(C) Imaginary and odd

(D) Imaginary and even

99. If $\text{DFT}\{x(n)\} = X(k)$ and $\text{DFT}\{y(n)\} = Y(k)$ then which of the following is the valid Parseval's theorem expression ?

(A) $\sum_{n=0}^{N-1} x(n)y^*(n) = \sum_{k=0}^{N-1} X(k)Y^*(k)$

(B) $\sum_{n=-\infty}^{\infty} x(n)y^*(n) = \sum_{k=-\infty}^{\infty} X(k)Y^*(k)$

(C) $\sum_{n=0}^{N-1} x(n)y^*(n) = N \sum_{k=-\infty}^{\infty} X(k)Y^*(k)$

(D) $\sum_{n=0}^{N-1} x(n)y^*(n) = \left(\frac{1}{N}\right) \sum_{k=0}^{N-1} X(k)Y^*(k)$

100. If $\text{DFT}\{x(n)\} = \{12, -4 + j4, -4, -4 - j4\}$ then the DFT $\{x((n-3))_4\}$ is

(A) $\{12, -4 - j4, 4, -4 + j4\}$

(B) $\{12, -4 + j4, -4, -4 - j4\}$

(C) $\{12, -2 + j2, 4, -2 - j2\}$

(D) $\{12, -2 + j3, -4, -2 - j3\}$



Space for Rough Work



Space for Rough Work