

068/23

Question Booklet Alpha Code

A

A

Question Booklet Sl. No.

Total Number of Questions : 100

Time : 90 Minutes

Maximum Marks : 100

INSTRUCTIONS TO CANDIDATES

1. The Question Paper will be given in the form of a Question Booklet. There will be four versions of Question Booklets with Question Booklet Alpha Code viz. **A, B, C & D**.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the Question Booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a Question Booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your Question Booklet is un-numbered, please get it replaced by new Question Booklet with same alpha code.
6. The Question Booklet will be sealed at the middle of the right margin. Candidate should not open the Question Booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the Question Booklet supplied to him/her contains all the 100 questions in serial order. The Question Booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the Question Booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices **(A), (B), (C)** and **(D)** having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

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068/23

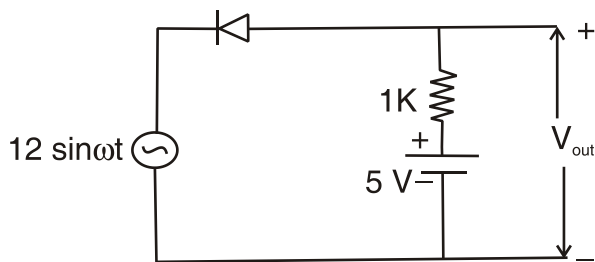
A

1. The mobility of electrons in a semiconductor is defined as the
 - A) Drift velocity per unit magnetic field
 - B) Diffusion velocity per unit magnetic field
 - C) Drift velocity per unit electric field
 - D) Diffusion velocity per unit electric field
2. In an intrinsic semiconductor, the free electron concentration depends on
 - A) The width of the forbidden energy band of the semiconductor
 - B) Effective mass of the electrons only
 - C) Effective mass of the holes only
 - D) Temperature of the semiconductor
3. Silicon is not suitable for fabrication of LEDs, because it is
 - A) A direct band gap semiconductor
 - B) An indirect band gap semiconductor
 - C) A narrow band gap semiconductor
 - D) A wide band gap semiconductor
4. Resistivity of a semiconductor depends on
 - A) Carrier mobility
 - B) Life time of polycrystalline materials
 - C) Carrier concentration in intrinsic semiconductor
 - D) Carrier concentration in extrinsic semiconductor
5. The diffusion length of a carrier depends on
 - A) The shape of the semiconductor
 - B) The life time of the carriers alone
 - C) The mobility and lifetime of the carriers
 - D) The mobility of the carriers alone
6. In an n-type semiconductor, as temperature increases, the Fermi level
 - A) Moves towards the conduction band
 - B) Moves towards middle of forbidden energy gap
 - C) Does not shift
 - D) May or may not shift depending on the concentration of donor atoms

7. Barrier potential in a PN junction is caused by
 - A) Thermally generated electrons and holes
 - B) Diffusion of majority carriers across the junction
 - C) Migration of minority carriers across the junction
 - D) Flow of drift current
8. The change in barrier potential of a silicon PN junction with temperature is
 - A) 0.0025 volts per degree C
 - B) 0.0250 volts per degree C
 - C) 0.0030 volts per degree C
 - D) 0.0014 volts per degree C
9. Consider a PN junction in which the P side is ten times more heavily doped than N side. The depletion region would extend
 - A) Equally on both N and P sides
 - B) More towards the P side and less towards the N side
 - C) More towards the N side and less towards the P side
 - D) Cannot be predicted
10. Negative resistance characteristics is exhibited by a
 - A) Zener diode
 - B) Schottky diode
 - C) Photo diode
 - D) Tunnel diode
11. The zener breakdown voltage _____ as temperature is increased.
 - A) Decreases
 - B) Increases
 - C) Remains constant
 - D) None of the above
12. Varactor diodes are used in
 - A) Tuning of an LC circuit
 - B) Special types of amplifiers
 - C) Parametric amplifiers
 - D) All of the above
13. In a tunnel diode, impurity concentration is of the order of
 - A) 1 in 10^3
 - B) 1 in 10^5
 - C) 1 in 10^7
 - D) 1 in 10^9
14. The ripple factor of power supply is a measure of
 - A) Its filter efficiency
 - B) Diode rating
 - C) Purity of power output
 - D) Its voltage regulation
15. Transformer utilization factor of a full wave rectifier is
 - A) 0.482
 - B) 0.693
 - C) 1.11
 - D) 0.821

16. Peak inverse voltage of each diode in a bridge rectifier is
 A) V_m B) $2 V_m$ C) $V_m/2$ D) $3 V_m$
17. For the capacitor filter, under no load condition, the ripple is
 A) Max B) 0 C) 1 D) None
18. In the diode volt ampere characteristics what will be the resistance, if a slope is drawn between the voltages 50 to 100 and corresponding current 5 to 10 ?
 A) 100Ω B) 50Ω C) 10Ω D) 5Ω
19. In a zener regulator, the change in load current produces, change in
 A) Zener voltage B) Zener current
 C) Both A) and B) D) None of the above
20. For a filter, no load output voltage is 300 V and full load output voltage is 280 V. The regulation of the circuit is
 A) 9.6% B) 4.2% C) 6.75% D) 7.1%
21. A series LCR circuit is resonant at 150 kHz and has a Q of 50. The lower half power frequency is
 A) 153 kHz B) 148.5 kHz C) 147.5 kHz D) 200 kHz
22. A 220 V DC motor has an armature resistance of 0.5Ω and the full load armature current of 20 A, then the back emf induced is
 A) 210 V B) 230 V C) 250 V D) 110 V
23. Transformers are rated in KVA, because they are working with
 A) Varying voltage B) Varying current
 C) Varying power D) Varying power factor
24. In slip ring induction motor which type of speed control is used ?
 A) Rotor rheostat B) Stator rheostat
 C) Flux control D) Armature control
25. Superposition theorem can be applicable only to circuits having _____ element.
 A) Non-linear B) Passive
 C) Linear bilateral D) Resistive

26. Determine the value of V_{EE} in UJT which causes the UJT to turn off, $R_e = 1 \text{ k ohm}$,
 $I_v = 10 \text{ mA}$
- A) 5 V
B) 10 V
C) 12 V
D) 7 V
27. Turn off of SCR is usually measured from the instant
- A) Anode current become zero
B) Gate current become zero
C) Anode voltage become zero
D) Anode current and voltage become zero for same instant
28. Operating frequency of an IGBT is around
- A) Greater than 50 kHz
B) Less than 50 kHz
C) Less than 1 MHz
D) Greater than 1 MHz
29. For a given input signal to the relay circuit what is the minimum value of output voltage



- A) 5 V B) 12 V C) -12 V D) -5 V
30. While doing base width modulation in BJT (NPN)
- A) V_{CB} is variable
B) V_{BE} is variable
C) V_{CB} is reverse biased and variable
D) V_{CB} is forward biased and variable
31. For a given emitter current the collector current can be increased by
- A) By reducing the recombination in base region
B) By reducing the base voltage in base emitter region
C) By increasing the base voltage in base emitter region
D) None of the above

32. Width of the conduction channel in MOSFET is
- A) Large at source side and decreasing at drain end
 - B) Large at drain side and decreasing at source end
 - C) Almost same from source to drain
 - D) More current will flow from drain to source hence width at drain end is large and source end is less
33. Pinch off voltage of JFET is
- A) The source to drain voltage at which the drain current starts to saturate
 - B) The source to drain voltage at which the source current starts to saturate
 - C) The drain to source voltage at which the drain current starts to saturate
 - D) The drain to source voltage at which the source current starts to increase
34. When latch up occurs in IGBT
- A) I_C is no longer controllable
 - B) I_g is no longer controllable
 - C) I_E is no longer controllable
 - D) Both I_E and I_g are not controllable
35. Secondary breakdown occurs in BJT due to
- A) Negative temperature coefficient of resistance
 - B) Positive temperature coefficient of resistance
 - C) Heavily doped emitter region
 - D) Heavily doped collector region
36. Which one of the following devices is not a switched mode DC power supply?
- A) Resonant converter
 - B) Push pull converter
 - C) Full bridge converter
 - D) Fly back forward converter
37. SMPSs are widely used than linear power supply due to
- A) Size and efficiency
 - B) Efficiency and regulations
 - C) Noise and cost
 - D) Regulations and noise
38. An AC LVDT has _____ input and _____ output.
- A) AC, DC
 - B) AC, AC
 - C) DC, DC
 - D) DC, AC

39. No contact is made between armature and core in
 A) Capacitive armature LVDT B) Spring extended armature LVDT
 C) Inductive armature LVDT D) Unguided armature LVDT
40. As per Stefan's law of radiation heat reduced by a body surfaces is
 A) Directly proportional to square of absolute temperature
 B) Directly proportional to the 4th power of its absolute temperature
 C) Inversely proportional to the 4th power of its absolute temperature
 D) Inversely proportional to the square of the absolute temperature
41. With Wheatstone bridge we can measure the resistance of _____ range.
 A) 100 Ω to a few teraohms B) 1 Ω to a few megaohms
 C) 10 Ω to 1000 Ω D) 1 Ω to a few teraohms
42. The types of faults in a telephone line are
 A) symmetrical and unsymmetrical B) triple line to line or line to ground
 C) line to line or line to ground D) open circuit and closed circuit
43. Which of the following statement are incorrect ?
 1. The main part of CRO is CRT
 2. A CRO can be used for direct measurement of power
 3. Time base generator is a part of CRT
 4. A CRO is used to measure phase displacement
 A) 1, 2 and 4 only B) 2 and 3 only
 C) 3 and 4 only D) All of the above
44. A circle is seen on the screen of a CRO when two time varying signals of same frequency and same magnitude are applied to X and Y plates of CRO. The relative phase difference is :
 A) 360° B) 90°
 C) 180° D) 45°
45. Which of the following modes of operation allows you to change the processor mode from a program/operator device and perform online program editing using programmable logic control ?
 A) REM mode B) PROG mode
 C) Test mode D) Run mode

46. Which of the following statement is not correct with IC741 ?
- | | |
|--------------------------|-------------------------|
| A) Infinite voltage gain | B) Zero input impedance |
| C) Zero output impedance | D) Infinite bandwidth |
47. An operational amplifier is labelled as LM741. The manufacturer's designation of the given IC is
- | | |
|---------------------------|----------------------|
| A) Motorola | B) Texas instruments |
| C) National semiconductor | D) RCA |
48. If a capacitor is placed in the feedback path of an op-amp circuit, then the circuit act as
- | | |
|-------------------|--------------------|
| A) Differentiator | B) Schmitt Trigger |
| C) Comparator | D) Integrator |
49. If $A_{DM} = 3500$ and $A_{CM} = 0.35$, the CMRR is
- | | |
|----------|---------|
| A) 1000 | B) 1001 |
| C) 10000 | D) 101 |
50. The common mode voltage gain of a differential amplifier is equal to R_C divided by
- | | |
|------------|-----------|
| A) $r'e$ | B) $2r'e$ |
| C) $r'e^2$ | D) $2R_E$ |
51. An operational amplifier with a gain of -10 and input resistance (R_i) equal to $10\text{ k}\Omega$, the feedback resistance (R_f) is
- | | |
|-------------------------|-------------------------|
| A) $100\text{ k}\Omega$ | B) $-10\text{ k}\Omega$ |
| C) $-1\text{ k}\Omega$ | D) $10\text{ k}\Omega$ |
52. In which state the PLL tracks any change in input frequency is at
- | | |
|------------------|-----------------|
| A) Capture Range | B) Pull-in-time |
| C) Hysteresis | D) Locked Range |
53. Which of the following statement is correct for 555 IC timers ?
- It operates in single mode
 - It operates in two modes
 - It operates in three modes
 - It operates in four modes
- | | |
|--------------------|------------------|
| A) Only ii and iii | B) Only iii |
| C) Only iv | D) Only i and iv |

54. What instrument is used to amplify the output signal of a transducer ?
 A) Peak detector
 B) Differential amplifier
 C) Instrumentation amplifier
 D) Bridge amplifier
55. In a R-2R ladder DAC, the typical value of R ranges from
 A) 3 k Ω to 10 k Ω
 B) 2.5 k Ω to 10 k Ω
 C) 2.5 Ω to 10 Ω
 D) 4.5 k Ω to 15 k Ω
56. Which of the following oscillator can be used where high stability of frequency is required ?
 A) Hartley Oscillator
 B) Colpitt's Oscillator
 C) Wien Bridge Oscillator
 D) Crystal Oscillator
57. Find the frequency of oscillation of a Wien Bridge Oscillator with R = 20 k Ω and C = 0.0010 μ F.
 A) 7.96 kHz
 B) 796 kHz
 C) 790 Hz
 D) 7.96 Hz
58. The output of an oscillator oscillates between OFF and ON states freely, it is called
 A) Monostable multivibrator
 B) Flip-flop
 C) Astable multivibrator
 D) Schmitt trigger
59. A Schmitt trigger achieves hysteresis by utilising
 A) Barkhausen's principle
 B) Avalanche multiplication in zener diode
 C) Re-generate positive feedback
 D) The magnetic property of a transformer
60. Which of the following criteria should be satisfied in order to use an amplifier as an oscillator ?
 A) $A\beta = 1$
 B) $A\beta = 0$
 C) $A \geq \beta$
 D) $A < (1/\beta)$
61. Which of the following is the hexadecimal equivalent of the binary number 10100110101111 ?
 A) 39ACF
 B) 29AF
 C) 1EB4
 D) 28AC

62. Which of the following code is used for labelling the cells of a Karnaugh map (K-map) ?
A) 8421 Binary
B) BCD Code
C) Gray Code
D) Decimal Code
63. The figure of merit of a logic family is often measured in the unit of
A) Pico joules
B) Milli watts
C) Nano seconds
D) Micro volts
64. The decimal equivalent of the octal number 6327.4051 is
A) 3287.5100098
B) 3872.5100088
C) 3278.5100089
D) 3287.5100089
65. In a half adder the carry output is high, if the inputs are :
A) 000
B) 001
C) 111
D) 101
66. How many flip-flops are required to construct a mod-32 counter ?
A) 31
B) 32
C) 8
D) 5
67. The minimum number of 2 input NAND Gates required implementing a 2 input XOR gate is
A) 5
B) 4
C) 6
D) 3
68. State the correct statement for 8051 architecture.
A) DPTR 8 bit, PC 16 bit, CPU 8 bit, PSW 16 bit, SP 16 bit
B) DPTR 16 bit, PC 8 bit, CPU 8 bit, PSW 16 bit, SP 8 bit
C) DPTR 8 bit, PC 16 bit, CPU 8 bit, PSW 8 bit, SP 16 bit
D) DPTR 16 bit, PC 16 bit, CPU 8 bit, PSW 8 bit, SP 8 bit
69. After reset SP register is initialized to address
A) 8 H
B) 9 H
C) 7 H
D) 6 H

70. Which among the following is not a feature of RAM ?
- A) Allows users to store multiple gigabytes of data
 - B) It can be accessed by the central processing unit
 - C) Data remains even after power supply is not present
 - D) None of the above
71. ROM is _____ and _____
- A) non-volatile, temporary
 - B) non-volatile, permanent
 - C) volatile, permanent
 - D) volatile, temporary
72. In TTL family high output corresponds to
- A) 0.8V to 2V
 - B) 2.4V to 5V
 - C) 2V to 5V
 - D) 0.4V to 2.4V
73. Which TTL family offers lowest power and the fastest operation ?
- A) High speed TTL
 - B) Schottkey TTL
 - C) Low power TTL
 - D) Low power Schottkey TTL
74. In a J-K flip flop, when $J = 1$ and $K = 1$, then it will be considered as
- A) Set condition
 - B) Toggle condition
 - C) Reset condition
 - D) No change
75. Which of the following memories uses one transistor and one capacitor as a basic memory unit ?
- A) DRAM
 - B) SRAM
 - C) Both A) and B)
 - D) NVRAM

76. In the Vidicon camera tube the material which is coated on the very thin metallic film called signal plate is of _____ nature.

A) Photo resistive	B) Photo conductive
C) Photo acoustic	D) Photo transitive
77. An example for audio file format is

A) Tiff	B) Jpeg	C) Gif	D) Mpeg
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78. The woofer system that is used only in the lower part of the audio spectrum is known as

A) Console	B) Speaker
C) Subwoofer	D) Microphone
79. In a DVD recording and playback is done by

A) Laser beam for both recording and playback
B) Video head for playback and laser for recording
C) UV for playback and recording
D) IR for both recording and playback
80. In TV transmission separation of sync pulses from the composite video waveform is done by

A) Differentiator circuit
B) Clipper circuit
C) Clamper circuit
D) Multivibrator circuit
81. The modulation process in which the carrier wave is continuous in nature is known as

A) Pulse modulation	B) Analog modulation
C) Pulse code modulation	D) None of the above
82. In amplitude modulation radio broadcast the maximum modulating signal frequency used is

A) 5 Hz	B) 5 kHz	C) 5 MHz	D) 5 Tera Hz
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83. The circuit which is used in FM receiver to remove noise present in the peak of received signal is

A) Clamper	B) Clipper	C) Limiter	D) Filter
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84. The probability density function of thermal noise is
A) Poisson
B) Gaussian
C) Binomial
D) Bessel
85. UHF range frequencies normally propagates by means of
A) space waves
B) sky waves
C) normal waves
D) ground waves
86. For tracking of satellites at very high frequency helical antennas are used due to
A) Ionosphere refraction
B) Tropospheric reflection
C) Internal reflection
D) Faraday's effect
87. QPSK is a modulation scheme where each symbol consists of
A) 4 bits
B) 2 bits
C) 1 bit
D) M number of bits, depending upon the requirement
88. The method used for demodulating FM wave is
A) Envelop detector
B) Multivibrator
C) Amplitude discrimination
D) Phase discrimination
89. In a linear broadside antenna array with half wave length spacing the directivity is equal to
A) Unity
B) Zero
C) Half of the number of elements present in array
D) Number of elements present in array
90. Which one of the following is the mode of propagation used in HF antennas ?
A) Ionospheric
B) Ground wave
C) Tropospheric
D) Free space
91. PAM signal is detected using
A) Low pass filter
B) High pass filter
C) Band pass filter
D) Resistor

92. The antenna parameter beam width indicates
A) Intensity
B) Gain
C) Directivity
D) Fading
93. What is the impedance of the folded dipole antenna ?
A) 500 Ω
B) 100 Ω
C) 300 Ω
D) 50 Ω
94. The charge carriers random behaviour is the reason for the generation of
A) Shot noise
B) Partition noise
C) Industrial noise
D) Flicker noise
95. In an Amplitude modulation circuit, the emitter modulator amplifier operates in
A) Class A mode
B) Class C mode
C) Class B mode
D) Class D mode
96. The number of 16-bit timers in 8051 are
A) 1
B) 2
C) 3
D) 4
97. An event that indicates the microcontroller that a device needs its service is
A) Interrupt
B) Paging
C) Segmentation
D) None of the above
98. The number of special function registers in 8051 microcontrollers are
A) 21
B) 10
C) 35
D) 5
99. In 8051 microcontroller all the interrupts are enabled or disabled using the bit
A) ET0
B) ET1
C) EA
D) EX1
100. When 8051 comes on then the address 0x00 is loaded to which register ?
A) PSW
B) A register
C) SP
D) PC
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Space for Rough Work

