

M. Sc. (Electronic Science) Entrance Test, 2017-2018

Time : 60 Minutes

Maximum Marks : 100

1. A magnetic field is :
 - (a) The current flow through space around a permanent magnet
 - (b) The force set up when current flows through a conductor
 - (c) The force that drives current through a resistor
 - (d) The force between the plates of a charged capacitor

2. A magnetic flux of 2.5×10^4 Wb through an area of 5×10^4 square metres results in :
 - (a) 5 Wb
 - (b) 0.5 Tesla of flux density
 - (c) 5×10^{-5} Wb of flux
 - (d) 5000 Tesla of flux density

3. What determines the atomic number of an element ?
 - (a) The number of protons
 - (b) The number of electrons
 - (c) The number of neutrons
 - (d) The number of neutrons and protons

4. Amorphous solid is also called :

(a) Crystalline	(b) Non-crystalline
(c) Polycrystalline	(d) Homogenous

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5. A law stating that the magnetic susceptibilities of most paramagnetic substances are inversely proportional to their absolute temperature :
- (a) Curie's Law (b) Child's Law
(c) CR Law (d) Curie-Weiss Law
6. Which of the following materials has the least hysteresis loop area ?
- (a) Soft iron (b) Silicon steel
(c) Hard steel (d) Wrought iron
7. The speed of an induction motor :
- (a) decreases too much with the increase of load
(b) Indecreases with the increase of load
(c) decreases slightly with the increase of load
(d) remains constant with the increase of load
8. Lenz law is the consequence of the law of conservation of :
- (a) Energy (b) Charge
(c) Momentum (d) Field lines
9. All magnetic fields originates from :
- (a) Moving electric charge (b) Iron atom
(c) Magnetic domain (d) Permanent domain
10. What is the colour code for a $220 \Omega \pm 5\%$ resistor ?
- (a) Red, Red, Brown, Gold
(b) Orange, Orange, Black, Gold
(c) Red, Red, Black, Silver
(d) Red, Red, Brown, Silver

11. A short circuit will have :
- (a) A small current flow
 - (b) A large current flow
 - (c) No current flow
 - (d) Some current flow
12. What is current gain for a common base configuration where $I_E = 4.2 \text{ mA}$ and $I_C = 4.0 \text{ mA}$?
- (a) 16.80
 - (b) 1.05
 - (c) 0.20
 - (d) 0.95
13. Which is the higher gain provided by a C-E Configuration ?
- (a) Voltage
 - (b) Current
 - (c) Power
 - (d) Resistance
14. Convert the decimal number 151.75 to binary :
- (a) 10000111.11
 - (b) 11010011.01
 - (c) 00111100.00
 - (d) 10010111.11
15. Convert 11001001_2 (binary) to decimal :
- (a) 201
 - (b) 2001
 - (c) 20
 - (d) 210
16. What is the result when a decimal 5238 is converted to base 16 ?
- (a) 327.375
 - (b) 12166
 - (c) 1388
 - (d) 1476

17. **Assertion (A)** : Atomic number of sodium is 11.

Reason (R) : Sodium has a body centred cubic lattice.

- (a) Both A and R are true and R is current explanation of A
- (b) Both A and R are true but R is not current explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

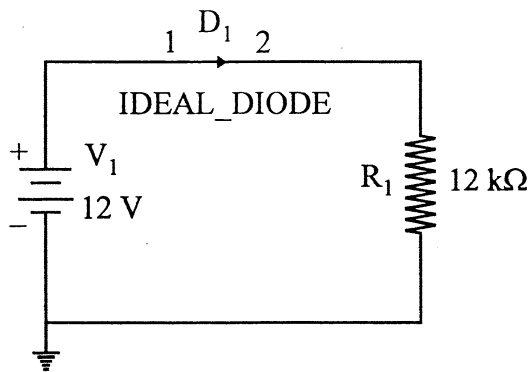
18. With the E-MOSFET, when gate input voltage is zero, drain current is :

- (a) at saturation
- (b) zero
- (c) I_{DSS}
- (d) widening the channel

19. The transconductance curve of a JFET is a graph of :

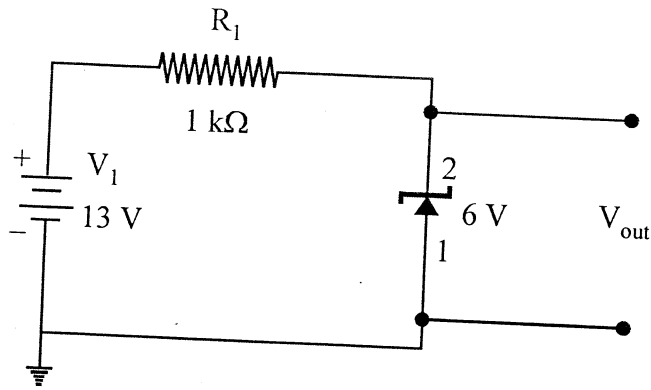
- (a) I_S versus V_{DS}
- (b) I_C versus V_{CE}
- (c) I_D versus V_{GS}
- (d) $I_D \times R_{DS}$

20. What is the current through the diode ?



- (a) 1 mA
- (b) 0.975 mA
- (c) 0.942 mA
- (d) 0.0 mA

21. What is the current through the Zener diode ?



- (a) 0 mA
(b) 7 mA
(c) 8.3 mA
(d) 13 mA

22. The primary function of the oscillator in an isolation amplifier is to :

- (a) convert dc to high-frequency ac
(b) convert dc to low-frequency ac
(c) rectify high-frequency ac to dc
(d) produce dual-polarity dc voltages for the input to the demodulator

23. A half-wave diode circuit using ideal diode has an input voltage $2 \sin \omega t$ volts. Then average and rms values of output voltage are :

- (a) $\frac{10}{\pi}$ V and 10 V
(b) $\frac{20}{\pi}$ V and 10 V
(c) $\frac{10}{\pi}$ V and 5 V
(d) $\frac{20}{\pi}$ V and 5 V

24. **Assertion (A)** : The conductivity of *p* type semiconductor is higher than that of intrinsic semiconductor.
Reason (R) : The addition of donor impurity creates additional energy levels below conduction band.
- (a) Both A and R are true and R is correct explanation of A
 - (b) Both A and R are true but R is not a correct explanation of A
 - (c) A is true but R is false
 - (d) A is false but R is true
25. A potential of 7 V is applied to a silicon diode. A resistance of 1 K ohm is also in series with the diode. The current is :
- (a) 7 mA
 - (b) 6.3 mA
 - (c) 0.7 mA
 - (d) 0.6 mA
26. The input impedance of short-circuited line of length *l* where $\lambda/4, < l < \lambda/2$, is :
- (a) resistive
 - (b) inductive
 - (c) capacitive
 - (d) none of these
27. R-C Coupling is used for :
- (a) Power amplification
 - (b) Current amplification
 - (c) Voltage amplification
 - (d) Direct amplification
28. The power requirements of a DRAM in active and stand by modes is about :
- (a) 350 mW and 5 mW respectively
 - (b) 350 mW each
 - (c) 5 mW each
 - (d) 350 mW and 100 mW respectively

29. Incompatibility between memory and I/O device may be due to :
- (a) timing according to which data transfer is to take place
 - (b) electrical characteristics of the two devices
 - (c) format of data transfer
 - (d) all of the above
30. A certain fiber-optic cable has the following characteristics : $n_1 = 1.82$ and $n_2 = 1.73$. What is the value of θ_c ?
- (a) 71.90°
 - (b) 0.95°
 - (c) 18.1°
 - (d) 1.81°
31. Light may be propagated along a fiber-optic cable in which of the following modes ?
- (a) multimode step index
 - (b) single-mode step index
 - (c) multimode graded index
 - (d) all of the above
32. Which of the following devices is (are) a component of a digital-to-analog converter (DAC) ?
- (a) Integator
 - (b) Comparator
 - (c) Digital counter
 - (d) All of these
33. For an op-amp having a slew rate $SR = 5$ V/ms, what is the maximum closed-loop voltage gain that can be used when the input signal varies by 0.2 V in 10 ms ?
- (a) 150
 - (b) 200
 - (c) 250
 - (d) 300

34. How many NAND circuits are contained in a 7400 NAND IC ?

- (a) 1
- (b) 2
- (c) 4
- (d) 8

35. An OR gate is converted into AND by :

- (a) Inverting all inputs
- (b) Inverting output
- (c) Inverting one input
- (d) Inverting all inputs and also the outputs

36. Advance form of ROM is :

- (a) EEPROM
- (b) EPROM
- (c) ROM
- (d) PROM

37. The Boolean identity $A + AB$ is equal to :

- (a) 0
- (b) A
- (c) B
- (d) 1

38. Temperature coefficient of resistance of semiconductor is :

- (a) Constant
- (b) Zero
- (c) Negative
- (d) Positive

39. Which one of the following is *not* an elementary particle ?

- (a) α -Particle
- (b) Electron
- (c) Proton
- (d) Neutron

40. Depletion region is :
- (a) Positively Charged
 - (b) Negatively Charged
 - (c) Completely neutral and has no charge
 - (d) A charged region of positive and negative ions at the junction
41. A P-type semiconductor has :
- (a) Electron in excess
 - (b) Holes in excess
 - (c) Holes and electron, both in excess
 - (d) Neither holes nor electron in excess
42. ICs are generally made of :
- (a) Germanium
 - (b) Silicon
 - (c) Aluminium
 - (d) Ceramic
43. An SCR is a :
- (a) Current triggered device
 - (b) Voltage triggered device
 - (c) Power triggered device
 - (d) None of these
44. A multivibrator that generates a square wave of its own is called a :
- (a) Monostable multivibrator
 - (b) Bistable multivibrator
 - (c) Astable multivibrator
 - (d) None of the above

45. A mixer is fed with the frequencies $f_x = 32$ MHz and $f_y = 28$ MHz. The beat frequencies will be :
- (a) 4 kHz and 50 kHz (b) ± 4 MHz
(c) 50 kHz and 4 kHz (d) 30 MHz
46. An Oscillator is an electronic device which convert :
- (a) Mechanical energy into electrical energy
(b) Electrical power into mechanical power
(c) DC power into AC power
(d) AC power into DC power
47. The final stage of the amplifier uses :
- (a) R-C coupling (b) Transformer coupling
(c) Direct coupling (d) All of these
48. In a crystal diode, the barrier potential offer opposition to only :
- (a) Free electron in n -region (b) Holes in p -region
(c) Majority carrier in both regions (d) Minority carrier in both regions
49. The device design to operate in breakdown voltage is known as :
- (a) Diode (b) Triode
(c) Zener diode (d) Transister
50. X-ray spectrum may be :
- (a) Continuous spectrum (b) Discontinuous spectrum
(c) Line spectrum (d) Both (a) and (c)