

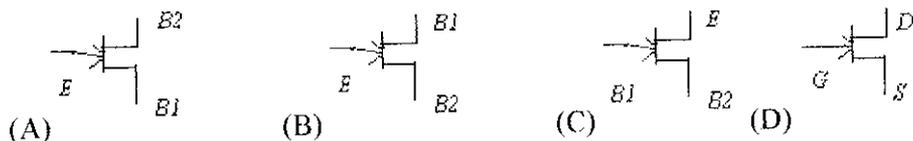
B.E. DEGREE EXAMINATIONS: OCTOBER / NOVEMBER-2008

Second Semester

Electronics and Communication Engineering**U07EC206: ELECTRON DEVICES**Time: **THREE Hours**Maximum Marks: **100****Answer ALL Questions: -****PART A (20 x 2 = 40 Marks)**

- The force on a unit positive charge at any point in an electric field is, by definition, the _____ at that point.
 (A) Electric field intensity (B) Magnetic field intensity
 (C) Electric Potential (D) Potential energy
- A unit of Work or Energy, called the electron volt (eV) is defined as _____.
 (A) $1 \text{ eV} = 1.66 * 10^{-27} \text{ Kg}$ (B) $1 \text{ eV} = 1.60 * 10^{-19} \text{ C}$
 (C) $1 \text{ eV} = 1.60 * 10^{-19} \text{ J}$ (D) $1 \text{ eV} = 9.109 * 10^{-31} \text{ Kg}$
- A very poor conductor of electricity is called an _____, excellent conductor is a _____, and a substance whose conductivity lies between these extremes is a _____.
 (A) Semiconductor, Metal, Insulator (B) Metal, Semiconductor, Insulators
 (C) Insulators, Semiconductor, Metal (D) Insulator, Metal, Semiconductor.
- The _____ of a cathode-ray tube is defined as the deflection (in meters) on the Screen per volt of deflecting voltage.
 (A) Magnetic-deflection sensitivity (B) Magnetic Focusing
 (C) Electro-static deflection sensitivity (D) Cyclotron frequency
- A small amount of _____ impurities such as arsenic, antimony or phosphorous is added to the pure semiconductor to get N type semiconductor.
 (A) Trivalent (B) Pentavalent (C) Bivalent (D) Tetravalent
- If a metal or semiconductor carrying a current I is placed in a transverse magnetic field, an _____ field is induced in the direction _____ to both current and magnetic field. This phenomenon, known as the Hall effect.
 (A) electric, perpendicular (B) magnetic, perpendicular
 (C) magnetic, parallel (D) electric, parallel
- In an n-type material the _____ concentration is approximately equal to the density of _____ atoms.
 (A) free-electron, acceptor (B) free-hole, donar
 (C) electron-hole pair, donar (D) free-electron, donar
- Hall effect is used to determine whether a semiconductor is n or p type and to find the _____.
 (A) Mobility (B) Carrier Concentration
 (C) Drift current (D) Diffusion current
- The rate of change of injected charge with applied voltage is known as _____ capacitance.
 (A) Storage (B) Space-charge (C) Transition (D) Depletion region.

10. For _____ doped diodes, _____ breakdown voltage becomes high & breakdown is then predominantly by Avalanche multiplication.
 (A) lightly, avalanche (B) heavily, zener
 (C) lightly, zener (D) heavily, avalanche
11. The _____ diodes are used in FM radio & TV receivers, AFC circuits, self adjusting bridge circuits.
 (A) Tunnel (B) Backward (C) Step-recovery (D) Varactor
12. Tunnel diode is a _____ junction diode which exhibits _____ resistance under low forward bias conditions.
 (A) thin, positive (B) thin, negative
 (C) thick, positive (D) thick, negative
13. In BJT, the arrow on the emitter specifies the direction of _____ flow when the emitter-base junction is _____ biased.
 (A) voltage, reverse (B) current, reverse
 (C) voltage, forward (D) current, forward.
14. _____ is defined as the ratio of the change in emitter voltage to the change in emitter current with the collector voltage V_{CB} kept constant.
 (A) Input impedance (B) Output impedance
 (C) Forward current gain (D) Reverse voltage gain
15. FET is _____ device & _____ controlled device.
 (A) Tripolar, current (B) Bipolar, voltage
 (C) Unipolar, voltage (D) Unipolar, current.
16. When the reverse gate voltage of JFET changes from 4.0 to 3.9V, the drain current changes from 1.3 to 1.6mA. Find the value of Transconductance.
 (A) 0.3 m (B) 3 m (C) 5 m (D) 0.03m.
17. SCR is a _____ layer _____ terminal device.
 (A) 3,4 (B) 4,3 (C) 4,2 (D) 3,2
18. In Thyristor, _____ current is the minimum current required to latch or trigger the device from its OFF to its ON state.
 (A) Holding (B) Gate (C) Latching (D) Drain
19. Triac is a _____ terminal semiconductor switching device which can control _____ in a load.
 (A) 3, dc (B) 2, ac (C) 2, dc (D) 3, ac
20. Circuit symbol of UJT



PART B (5 x 12 = 60 Marks)

21. (a) State & explain Mass-Action law. (6)
 (b) Write the details about Fermi-Dirac probability distribution function. (6)

(OR)

- (a) Define electro-static deflection & magnetic deflection sensitivity and explain it. (6)
- (b) Write short notes about force on charge in E field and moving charge in H field. (6)
22. (a) Draw the band structure of an PN junction and explain it. (6)
- (b) Explain the current components in a PN junction. (6)
- (OR)**
- (a) Explain about Hall effect. Define Diffusion current and Drift current. (6)
- (b) Calculate the location of Fermi level in a semiconductor having impurities. (6)
23. (a) Define the term transition capacitance & Diffusion capacitance of a PN diode. (4)
- (b) Distinguish between avalanche and zener mechanisms. Explain the effect of temperature of a diodes. (8)
- (OR)**
- (a) Draw the VI characteristics of backward diode and explain it. (4)
- (b) From the energy band diagram explain the VI characteristics of a tunnel diode. Draw the equivalent circuit of a tunnel diode & explain it. (8)
24. (a) Compare JFET & BJT. (5)
- (b) Explain the input & output characteristics of a transistor in CB configuration. (7)
- (OR)**
- (a) What is MOSFET? How many types of MOSFETs are there? (4)
- (b) With the help of suitable diagrams explain the working of different types of MOSFET. (8)
25. (a) Draw the 2-transistor model of an SCR & explain its breakdown operation. (6)
- (b) What is a Traic? Sketch its characteristics and describe its operation. (6)
- (OR)**
- (a) Draw the equivalent circuit of UJT & explain its operation with the help of emitter characteristics. Mention some of the applications of UJT. (8)
- (b) Describe the operation of Shockley (PNPN) diode. (4)
