

**FUNDAMENTALS OF ELECTRICAL ENGINEERING**  
**(Electrical and Electronics Engineering)**

**Time: 3 hours**

**Max Marks: 70**

**PART-A**

**Answer all questions**

**[10 x 1=10M]**

1. a) What is the limitation of Ohm's law?
- b) What is a dependent source?
- c) Define Phase difference?
- d) Convert  $(6+j8)$  into polar form.
- e) Define Reluctance and what are its units?
- f) Define electric flux.
- g) Formula for co-efficient of coupling.
- h) Define Controlling torque
- i) What is the purpose of a ceiling rose?
- j) Define Adopter

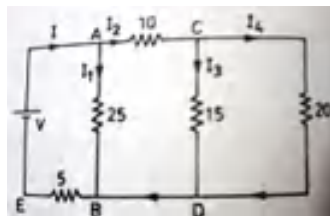
**PART - B**

**Answer one question from each unit**

**[5X12=60M]**

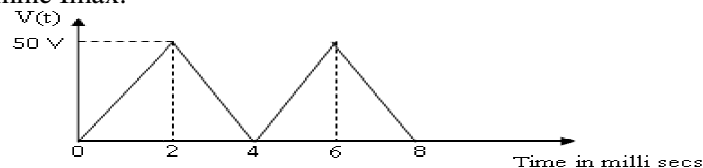
**UNIT-I**

2. a) Explain the procedures of applying Kirchhoff's laws to circuits in solving them with suitable examples. [6M]
- b) In the following circuit find the value of supply voltage  $V$  so that 20ohm resistor can dissipate 180watt. [6M]



**OR**

3. a) Explain the difference between independent and dependent source with suitable examples. [6M]
- b) The voltage waveform shown in figure is applied to a pure inductor of 50 mH. Sketch  $i(t)$  and determine  $I_{max}$ . [6M]



# AR13

**Code: 13EE1001**

**SET-1**

## UNIT-II

- 4.a) In an electrical circuit R, L and C are connected in parallel.  $R = 10\Omega$ ,  $L = 0.1 \text{ H}$  and  $C = 100 \mu\text{F}$ . The circuit is energized with supply at 230 V, 50 Hz. Calculate (i) the impedance ii) current taken from the supply (iii) power factor of the circuit and power consumed by the circuit. [6M]
- b) Define power factor. How the power factor of a series RL circuit differs from that of a series RC circuit [6M]

**OR**

5. An air cored choking coil takes a current of 2Amps and dissipates 200W when connected a 200V, 50Hz mains. In other coil the current taken is 3Amps and the power 270W under the same conditions. Calculate the current and the total power consumed when the coils are in series. [12M]

## UNIT-III

6. Two coils having 30 and 600 turns respectively are wound side by side on a closed iron circuit of area of X-section 100sq.cm. and mean length 200 cm. Estimate the mutual inductance between the coils if the relative permeability of the iron is 2000. If a current of zero amperes grows to 20A in a time of 0.02 second in the first coil, find the e.m.f induced in the second coil. [12M]

**OR**

7. a) compare electrical and magnetic circuits in any 6 aspects. [6M]  
b) a coil of 500 turns and resistance of 20ohm is wound uniformly on an iron ring of mean circumference 50cm and cross sectional area 4 sq.cm. it is connected to a 24V dc supply. Under these conditions, the relative permeability of iron is 800 calculate the values of 1) the mmf 2) the magnetizing force 3) total flux in the iron 4) the reluctance of the ring. [6M]

## UNIT-IV

8. a) Describe the construction and working of a PMMC instrument. [6M]  
b) Derive the equation for deflection if the instrument is spring controlled? [6M]

**OR**

9. With the help of neat diagram, explain the working of Moving Iron instrument? Derive the expression for deflecting torque of Moving iron instruments? [12M]

## UNIT-V

10. What is the difference between a switch and a circuit breaker? Explain the function of any 3 switches with neat symbols. [12M]

**OR**

11. What are the different types of living room wiring components and explain each. [12M]

# AR13

**Code: 13ME1001**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B. Tech I Semester Regular/ Supplementary Examinations, December, 2015**

## **ENGINEERING DRAWING (Civil Engineering)**

**Time: 3 hours**

**Max Marks: 70**

### **PART-A**

**Answer all questions**

**[10 x 1=10M]**

1. a) Give two practical applications of an enlarged scale?  
b) What is a conic section?  
c) Define elevation?  
d) When will be the front view of a straight line show the true length of the line?  
e) The surface of a hexagon plane is perpendicular to both VP and HP. Which Orthographic view will show the true shape.  
f) What is side view of a plane?  
g) Define cone in the form of surface revolution?  
h) State the shape and number of faces in icosahedron?  
i) What is the relation between true length and isometric length?  
j) Isometric projection or Isometric view of a square will be a \_\_\_\_\_

### **PART- B**

**Answer one question from each unit**

**[5 x 12=60M]**

#### **UNIT- I**

2. The major axis of an ellipse is 150 mm long and the minor axis is 100 mm long. Find the foci and draw an ellipse by 'arcs of circles' method. Draw a tangent to the ellipse at a point on it 25mm above the major axis. **12 M**
- (OR)
3. a) Draw a diagonal scale of RF= 1 / 2.5 and long enough to measure 30 cm. Show a distance of 22.5 cm on it. **8 M**  
(b) Construct a Hexagon inscribed in a circle of 60 mm diameter. **4 M**

#### **UNIT- II**

4. a) A point A is 20mm above H.P. and in the first quadrant. Its shortest distance from the reference line XY is 40mm. Draw the projections of the point and determine its distance from V.P. **6 M**  
b) A point at 25 mm above the reference line x y is the front view of two points A and B. The top view of A is 40mm behind V.P. and the top view of B is 50mm in front of V.P. Draw the projections of the points and state their positions relative to the planes of projection and the quadrants in which they lie. **6 M**

**(OR)**

5. (a) A line PQ, 90 mm long, is in the H.P. and makes an angle of  $30^\circ$  with the V.P. Its end P is 25 mm in front of the V.P. Draw its projections. **6 M**  
(b) The length of the top view of a line parallel to the V.P. and inclined at  $45^\circ$  to the H.P. is 50 mm. One end of the line is 12 mm above the H.P. and 25 mm in front of the V.P. Draw the projections of the line and determine its true length. **6 M**

### UNIT- III

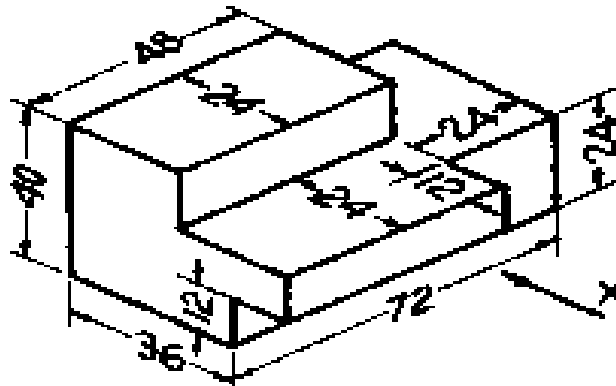
6. A regular hexagonal plate of 45 mm side has a corner on H.P. and its surface is inclined at  $45^\circ$  to H.P. Draw the projections, when the diagonal through the corner, which is on H.P. makes  $30^\circ$  with V.P. **12 M**  
(OR)  
7. A plate having shape of an isosceles triangle has base 50 mm and altitude 70 mm. It is so placed that in front view it is seen as an equilateral triangle of 50 mm sides and one side inclined at  $45^\circ$  to xy. Draw its top view. **12 M**

### UNIT- IV

8. A hexagonal prism having a 20 mm edge of its base and an axis of 50 mm long, is resting on one of its rectangular faces on HP with the axis perpendicular to the profile plane. Draw the projections of the prism. **12 M**  
(OR)  
9. Draw the projections of a cone of base diameter 40 mm and axis 60 mm when the axis is parallel to VP and resting on a generator in HP. **12 M**

### UNIT- V

10. Draw (i) front view (ii) side view from the left (iii) top view **12 M**



(OR)

11. A cylindrical slab of 75 mm diameter and 45 mm thick is surmounted by a cube of 38 mm side. On the top of the cube rests a square pyramid of altitude of 38 mm and side of base 25 mm. the axes of the solids are in the same straight line. Draw the isometric view of the setup. **12 M**

# AR13

**Code: 13EC1001**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B. Tech I Semester Regular / Supplementary Examinations, December-2015**

**ELECTRONIC DEVICES**

**(Electronics and Communication Engineering)**

**Time: 3 hours**

**Max Marks: 70**

## **PART – A**

**Answer all questions**

**[10 x 1=10M]**

- 1
  - a) Define Potential?
  - b) Define Current density
  - c) Define mobility of an electron?
  - d) What is meant by p-type semiconductors?
  - e) Define drift current?
  - f) In n-type semiconductor Fermi level lies close to  $E_c$  or  $E_v$ ?
  - g) Define peak inverse voltage (PIV)
  - h) Define regulation
  - i) Why NPN transistors are more preferred over PNP transistors?
  - j) Write down the relation between  $\alpha$ ,  $\beta$ , for a transistors/

## **PART-B**

**Answer one question from each Unit**

**[5 x 12=60 M]**

### **UNIT-I**

- 2
  - a) Define the expression for motion of an electron in a magnetic field? [6M]
  - b) A charged particle having charge thrice that of an electron and mass twice that of an electron is accelerated through a potential difference of 50V before it enters a uniform magnetic field of flux density of  $0.02 \text{ wb/m}^2$ , at an angle of  $25^\circ$  with the field. Find out [6M]
    - i) The velocity of the charged particle before entering the field?
    - ii) Radius of the helical path?
    - iii) Time for one revolution?

**(OR)**

- 3
  - a) Clearly explain the principle concept of magnetic deflection in a cathode ray tube and derive the expression for magnetic deflection sensitivity? [8M]
  - b) The electron beam in a CRT is displaced vertically by a magnetic field of flux density  $2 \times 10^{-4} \text{ wb/m}^2$ , the length of the magnetic field along the tube axis is the same as that of the electrostatic deflection plates. The final anode voltage is 800V, Calculate the voltage which should be applied to the y-deflection plates 1 cm apart, to returns the spot back to the centre of the screen. [4M]

### **UNIT-II**

- 4
  - a) Explain the concept of Fermi level in an intrinsic semiconductor with neat sketches? [8M]
  - b) In a P-type semiconductor, the Fermi level is 0.3eV above the valance band at a room temperature of 300 K. Determine the new position of the Fermi level for temperature at 350 K? [4M]

**(OR)**

# AR13

**Code: 13EC1001**

**SET-2**

- 5 a) Derive the expression for Fermi level in intrinsic semiconductor? [6M]  
b) Determine the concentration of Free electrons and holes in a sample of germanium at  $27^{\circ}\text{C}$  which has a concentration of donor atoms is  $2 \times 10^{14}$  atoms/cm<sup>3</sup> and a concentration of acceptor atoms is  $3 \times 10^{14}$  atoms/cm<sup>3</sup>. Is this p-type or n-type Ge?  
The conductivity due primarily to holes or electrons?

## UNIT-III

- 6 a) With neat sketches clearly explain the forward biased diode, reverse biased diode concepts? [6M]  
b) Explain the V-I characteristics of a PN junction diode ? [6M]

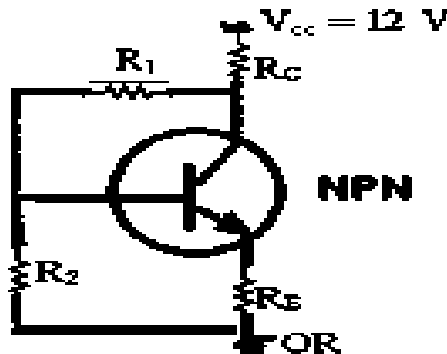
(OR)

- 7 a) Derive the expression for a half wave rectifier circuit for below mentioned?  
i) Average Current ii) RMS Value of Current iii) Ripple factor iv) Rectification Factor [6M]  
b) Explain Avalanche and Zener breakdown mechanisms [6M]

## UNIT-IV

- 8 a) With neat sketches, clearly explain the operation of NPN transistors and operation of PNP transistor with current components? [6M]  
b) Find out  $R_1$  for the given CE circuit? [6M]  
 $R_C = 3.3 \text{ k}\Omega$ ;  $V_{BE} = 0.6 \text{ V}$ ;  
 $I_E = -2 \text{ mA}$ ;  $\alpha = 0.98$ ;  $R_2 = 20 \text{ k}\Omega$   $R_E = 100 \Omega$

Neglect reverse saturation current ( $I_0$ ) for this below circuit



(OR)

- 9 Explain about input and output characteristics of Transistor CE Configurations with neat sketches? [12M]

## UNIT-V

- 10 With neat sketches clearly explain the FET operation in different conditions? [6M]  
i)  $V_{DS} = V_{PO}$ ; For N-Channel FET Circuit [6M]  
ii)  $V_{DS} > V_{PO}$ ;

(OR)

- 11 a) Explain the drain characteristics of a n – Channel MOSFET Circuit? [6M]  
b) What are the advantages of N-channel MOS FET over P-channel MOSFET Circuits? [6M]