

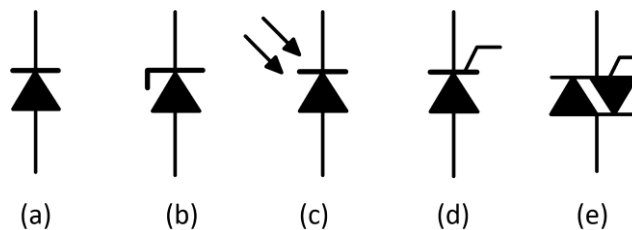
## QUESTION SET B

Target time: 60 minutes

1. A 9 V battery supplies a current of 18 mA to a resistor of unknown value. Determine the value of resistance and the power dissipated in it.

2. Three  $27\ \Omega$  resistors are connected in (a) series; and (b) parallel. Determine the effective resistance of each circuit arrangement and the current that will flow when each is connected to a 15 V DC supply.

3. Identify each of the diode symbols shown in Figure 1.



*Figure 1 See Question 3*

4. Resistors of  $150\ \Omega$  are available. Sketch circuits showing how three of these resistors can be connected to produce resistances of (a)  $50\ \Omega$ ; (b)  $225\ \Omega$ ; and (c)  $450\ \Omega$ .

5. A capacitor is required to store a charge of  $1.2\ \text{mC}$  when charged from a 220 V DC supply. Determine (a) the value of capacitance required; and (b) the energy that will be stored in the capacitor.

6. An AC voltage has an r.m.s. value of 50 V and a frequency of 400 Hz. Write down an expression for the voltage and use it to determine the instantaneous voltage at (a)  $t = 0.5\ \text{ms}$ ; and (b)  $t = 1.5\ \text{ms}$ .

7. An L-C tuned circuit is to be resonant over the range 100 kHz to 250 kHz. If an inductor of  $200\ \mu\text{H}$  is available determine the maximum and minimum values of capacitance required.

8. Sketch the truth tables for each of the logic gates shown in Figure 2. Also state the logic function of each gate.

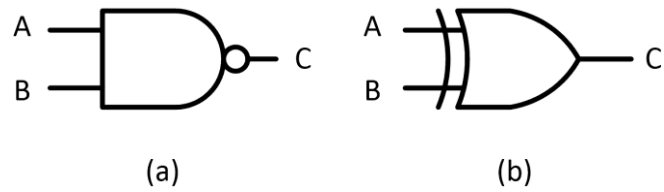


Figure 2 See Question 8

- 9 (a) Sketch a circuit diagram showing how an analogue moving coil meter can be used as an ohmmeter;  
 (b) Identify the reading indicated on the digital multi-meter in Figure 3.

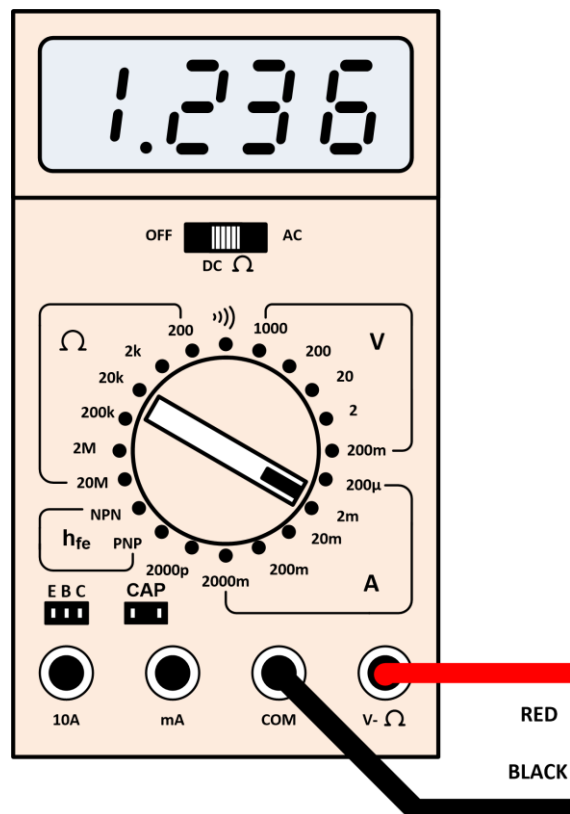


Figure 3 See Question 9

10. Sketch the circuit of a simple common emitter amplifier stage. Explain, briefly, the function of each component used.