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No. of Printed pages: 02

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## SARDAR PATEL UNIVERSITY

B.Sc. Semester III (Electronics)

Subject: Electronic Devices

Subject Code: US03CELE21

Date & Day: 15<sup>th</sup> November 2022, Tuesday

Time: 10:00 AM to 01:00 PM

Total Marks: 70

Note: Figures to the right indicate maximum marks.

Assume data wherever necessary.

### Q-1 Multiple Choice Questions

[10]

1. Metal film resistor is made from \_\_\_\_\_.  
[a] Nickel [b] Silver  
[c] Carbon [d] Germanium
2. Reactance of capacitance is given by  $X_L$  \_\_\_\_\_.  
[a]  $2\pi fL$  [b]  $2fL$   
[c]  $1/2\pi fL$  [d]  $2\pi$
3. Impure semiconductor material is termed as \_\_\_\_\_ material.  
[a] Intrinsic [b] Extrinsic  
[c] Metal [d] None
4. Donor semiconductor material is referred to as \_\_\_\_\_ material.  
[a] Intrinsic [b] Extrinsic  
[c] Un-doped [d] None
5. The output of a voltage multiplier is \_\_\_\_\_ volt  
[a] DC [b] AC-DC  
[c] AC [d] DC-AC
6. Square-law diode modulator uses \_\_\_\_\_ portion of the characteristics.  
[a] Linear [b] Non-linear  
[c] Linear and non-linear [d] None
7. Thermistor has \_\_\_\_\_ temperature co-efficient.  
[a] Positive [b] Negative  
[c] Zero [d] None
8. Tunnel diode is also referred to as \_\_\_\_\_ diode.  
[a] Cut-off [b] Blanking  
[c] Esaki [d] None
9. The voltage variable capacitor is a simply \_\_\_\_\_ biased diode.  
[a] Forward [b] Reverse  
[c] Zero [d] None
10. In amplitude modulation, the \_\_\_\_\_ of carrier signal varies as per modulating signal.  
[a] Amplitude [b] Phase  
[c] Frequency [d] None

P.T.O

**Q-2** Answer any ten question briefly. [20]

1. Differentiate between active and passive component.
2. Write a note on potentiometer.
3. Draw and label the diagram of Carbon Film Resistors.
4. Explain temperature effects in reverse biased PN junction diode.
5. With necessary example explain how does insulating material has high resistivity.
6. Distinguish between p-type and n-type semiconductor material.
7. Define: amplitude modulation.
8. Draw the basic circuit of linear diode detector.
9. What do you mean by modulation index?
10. Draw the symbol of voltage variable capacitor and tunnel diode.
11. List out the applications of thermistor.
12. Draw the output arrangement for charge coupled device.

**Q-3** (a) List different types of fixed resistor and explain any two fixed capacitors in detail. [06]

(b) Calculate the resistance of a carbon film resistor having the color code for band-1 brown, band-2 grey, band -3 orange and band-4 gold. [04]

**OR**

**Q-3** (a) What is a Capacitor? What are the uses of capacitors? Discuss in detail the Mica and Ceramic Capacitors. [06]

(b) Write a note on electrolytic capacitors [04]

**Q-4** (a) Explain in detail the PN junction diode in reverse bias configuration. [05]

(b) Write a note on P-type semiconductor. [05]

**OR**

**Q-4** (a) Draw the circuit diagram for the step voltage response of a RL circuit and derive the expression for current. [10]

**Q-5** (a) Write a short note on peak rectifier. [05]

(b) Write a note on Half wave rectifier. [05]

**OR**

**Q-5** (a) Derive the expression for amplitude modulation with necessary waveform. Explain linear diode detector circuit. [10]

**Q-6** (a) Explain in detail about the voltage variable capacitor. [06]

(b) What is thermistor? Explain in detail about thermistor. [04]

**OR**

**Q-6** (a) Discuss in detail the construction and working of CCD (charge coupled device). [06]

(b) Show that how does the charge is transfer in CCD. [04]

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