

**Scheme – I**  
**Sample Question Paper**

**Programme name** : Diploma in Medical Electronics  
**Programme code** : MU  
**Semester** : Third  
**Course Title** : Electronic Devices and Circuits  
**Marks** : 70

22346

**Time: 3 Hrs.**

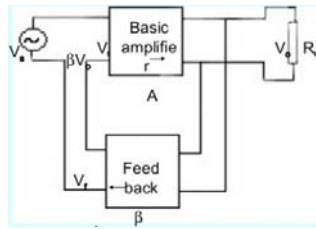
**Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

**Q.1) Attempt any FIVE of the following.**

**10 Marks**

- a) Draw symbol of PNP and NPN bipolar junction transistor.
- b) Write the function of emitter bypass capacitor and input coupling capacitor in single stage CE amplifier.
- c) State the Barkhausen's Criteria for sustained oscillations.
- d) Identify following feedback connection and convert it into current series feedback connection.



- e) List four applications of wave-shaping circuits
- f) Write the functions of rectifier and filter circuit in regulated power supply.
- g) Calculate load regulation if a voltage regulator produces 10.2V and 10V output at no-load and full-load conditions respectively.

**Q.2) Attempt any THREE of the following.**

**12 Marks**

- a) Draw output characteristics of BJT in CE configuration and label the operating regions. Write the status of BC and BE junctions in each region.
- b) Define the terms with respect to JFET.
  - i) Pinch-off voltage.
  - ii) DC drain resistance.
  - iii) Transconductance.
  - iv) Amplification factor
- c) Explain the cross over distortion. How it is overcome, show with circuit diagram.
- d) Describe the construction of EMOSFET with diagram.

**Q.3) Attempt any THREE of the following.**

**12 Marks**

- Explain the working principle of NPN transistor with suitable diagram.
- Draw equivalent circuit of UJT and explain its operating principle.
- Draw the circuit diagram of RC phase shift oscillator and explain how  $360^\circ$  phase shift occurs in it.
- The Positive half cycles are to be clipped from the given input signal ( $v_i=5\sin\omega t$ ), name and draw the circuit with input-output waveform.

**Q.4) Attempt any THREE of the following.**

**12 Marks**

- Derive the relation between current amplification factor in CE and CB transistor configuration.
- Find the value of  $V_{DS}$  and  $V_{GS}$  for the given values of  $I_D = 5\text{mA}$ ,  $V_{DD} = 10\text{V}$ ,  $R_D = 1\text{K}\Omega$  and  $R_S = 500\Omega$
- Single transistor is operating as an ideal class B amplifier with  $1\text{K}\Omega$  load. A dc meter in the collector reads  $10\text{mA}$ . How much signal power is delivered to the load.
- Name the power amplifier circuit used for audio signal amplification and explain with circuit diagram.
- Design regulated dual power supply for  $\pm 5\text{V}$  using regulator ICs.

**Q.5) Attempt any TWO of the following.**

**12 Marks**

- State the need of biasing of the transistor. Draw circuit diagram of voltage divider bias and write the function of each component.(2+2+2)
- Draw circuit diagram and frequency response of direct coupled amplifier. Write its drawbacks. (2+2+2)
- Draw circuit diagram of RC integrator for a sinusoidal input. Derive the expression for output voltage. In case if the same circuit is connected to a square wave signal generator, draw the output waveform.

**Q.6) Attempt any TWO of the following.**

**12 Marks**

- Calculate voltage gain  $A_F$  and input resistance  $R_{iF}$  in voltage series negative feedback amplifier. The voltage gain without feedback  $A = 500$ , input resistance without feedback  $R_i = 3\text{K}\Omega$  and feedback factor  $\beta = 0.01$ . Draw the block diagram of voltage series feedback connection.
- The dc level of  $+5\text{V}$  is to be added to the given input signal ( $v_i=5\sin\omega t$ ). Explain the working principle of this application along with the circuit diagram and input-output waveforms.
- Design a complete regulated power supply to drive an amplifier to give  $+12\text{V}$  regulated output using IC 78XX. Write the function of rectifier and filter circuit used in the circuit.

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**Sample Test Paper - I**

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**Course Title** : Electronic Devices and Circuits  
**Marks** : 20

22346

**Time: 1 Hour**

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**Q.1 Attempt any FOUR.**

**08 Marks**

- a) State the formula of current amplification factor in CE and CC configurations
- b) List the types of transistor biasing circuits.
- c) Draw frequency response of single stage CE amplifier. Write the formula of bandwidth.
- d) Write the conduction angle in class-A, class-B class-AB and class-C power amplifier.
- e) List four applications of JFET.
- f) Draw circuit diagram of self bias of FET.

**Q.2 Attempt any THREE.**

**12 Marks**

- a) Compare FET and BJT on the basis of input resistance, output current controlling parameter, power dissipation and current carriers.
- b) Explain the concept of dc load line for CE configuration of BJT.
- c) Draw circuit diagram and frequency response of RC coupled amplifier
- d) Describe the construction of E-MOSFET with diagram.

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**Q.1 Attempt any FOUR.**

**08 Marks**

- a) Write difference between positive and negative feedback.(any four points)
- b) Write two example of linear and non linear wave-shaping circuit.
- c) In UJT relaxation oscillator resistance and capacitance are  $100K\Omega$  and  $0.4\mu F$  respectively.  
Find the frequency of oscillation.
- d) Define the term i) Line regulation ii)Load regulation.
- e) Draw pin diagram of regulator IC 78XX and 79XX.
- f) Draw circuit diagram of RC differentiator and write the expression of output voltage.

**Q.2 Attempt any THREE.**

**12 Marks**

- a) Draw block diagram of regulated power supply and write the function of each block
- b) Explain the zener diode as voltage regulator with circuit diagram.
- c) Explain the operation of negative clamper with circuit diagram and its input output waveforms.
- d) In RC phase shift oscillator, if  $R_1=R_2=R_3=200K \Omega$  and  $C_1=C_2=C_3=100pF$ . Find the frequency of oscillation. Draw its circuit diagram.