

312309

25226

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

10

- (a) Define load and line regulation.
- (b) Define : (i) Dynamic drain resistance with respect to JFET (ii) Pinch off voltage
- (c) Draw the symbol of LED and Photodiode.
- (d) List the application of RC oscillator.
- (e) Draw circuit diagram of Common Base (CB) configuration of transistor.
- (f) Calculate the value of resistor using colour coding :
 - (i) Brown Black Red Silver
 - (ii) Red Orange Black Gold
- (g) Define Clipper and Clamper.

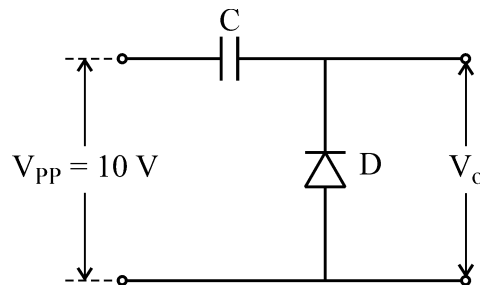


2. Attempt any THREE of the following :**12**

- (a) (i) State the Barkhausen's criteria.
- (ii) Draw the circuit diagram of Colpitt's oscillator.
- (b) Draw the block diagram of regulated power supply and state the function of each block.
- (c) Differentiate between active and passive components. (Any four points)
- (d) Describe the operating principle of Light Emitting Diode (LED) with neat diagram.

3. Attempt any THREE of the following :**12**

- (a) Identify the circuit shown below in Fig. No. 1 and draw input and output waveforms.

**Figure No. 1**

- (b) Draw the circuit diagram of class AB power amplifier and describe its working.
- (c) Describe the working of Hartley oscillator with neat circuit diagram.
- (d) Explain the operation of n-channel depletion type MOSFET.

4. Attempt any THREE of the following :**12**

- (a) Draw the time domain and frequency domain representation of sine wave and triangular wave.
- (b) Explain the operation of Switch Mode Power Supply (SMPS) with the help of block diagram.
- (c) State advantages and disadvantages of positive and negative feedback related to oscillator.
- (d) For a transistor $\alpha = 0.98$ and $I_C = 4 \text{ mA}$. Calculate I_B and I_E .
- (e) In Full Wave Bridge rectifier $V_m = 10 \text{ V}$, $R_L = 10 \text{ k}\Omega$. Find out V_{DC} , I_{DC} , ripple factor and PIV.

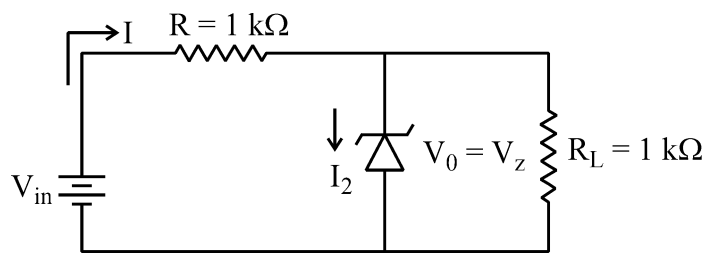
5. Attempt any TWO of the following :**12**

- (a)
 - (i) List any two applications of oscillator.
 - (ii) Calculate the frequency of oscillation for the values, given as $R = 8.2 \text{ k}\Omega$, $C = 0.01 \text{ }\mu\text{F}$, $R_1 = 1.2 \text{ k}\Omega$, $R_F = 39 \text{ k}\Omega$
- (b) A transistor is connected in common emitter configuration with collector supply V_{CC} of 8 V. Voltage drop across resistance RC connected in series with collector is 0.5 V. The value of RC is $800 \text{ }\Omega$. If alpha (α) equal to 0.96. calculate (i) Collector emitter voltage (V_{CE}) (ii) Collector Current (I_C) (iii) Base current (I_B).
- (c) Define the following terms related with an ac quantity :
 - (i) Amplitude
 - (ii) Frequency
 - (iii) Phase
 - (iv) Wavelength
 - (v) Time period

P.T.O.

6. Attempt any TWO of the following :**12**

- (a) Define α , β , γ of transistor. Give the relation between α and β of the transistor.
- (b) (i) Draw circuit of π filter. Also draw its input and output waveform.
(ii) Compare RC Integrator and RC differentiator.
- (c) For Zener voltage regulator, If $I_{zmin} = 2 \text{ mA}$, $I_{zmax} = 20 \text{ mA}$, $V_z = 4.7 \text{ V}$. Determine the range of input voltage over which output voltage remains constant. $R_L = 1 \text{ k}\Omega$, $R = 1 \text{ k}\Omega$, $Z_z = 0\Omega$, (Refer Fig. No. 2)

**Figure No. 2**