



17321

15162

3 Hours / 100 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) *Assume suitable data, if **necessary**.*
 - (6) *Mobile Phone, Pager and any other Electronic Communication devices are **not** permissible in Examination Hall.*

Marks

1. Attempt any ten of the following :

20

- a) Write the four specifications of zener diode.
- b) State the applications of LED.
- c) Draw construction of bipolar junction transistor give size and doping concentration of each region.
- d) Define line regulation and load regulation.
- e) Draw symbol of D-MOSFET (n-channel and p-channel).
- f) State the concept of cross-over distortion.
- g) State typical values of knee voltage for silicon and germanium P-N junction.
- h) State the applications of FET (any four).
- i) List various transistor biasing methods.
- j) State the Barkhausen criteria of oscillations.
- k) Define gain and bandwidth of small signal amplifier.
- l) Define amplification factor (μ) of JFET.
- m) Convert the following numbers.
 - i) $(5C7)_{16} = (\quad)_{10}$
 - ii) $(43)_8 = (\quad)_2$
- n) Draw a symbol and truth table of NOR gate.

P.T.O.



2. Attempt **any four** of the following :

16

- Draw a V-I characteristics of P-N junction diode in forward and reverse bias. Define static and dynamic resistance.
- Draw a circuit diagram of centre tapped full wave rectifier with series inductor filter. Draw its input and output waveforms.
- Compare CB and CE configurations with respect to input resistance, output resistance, voltage gain and current gain.
- Describe the voltage divider biasing technique of BJT with ckt. diagram.
- Describe the functional pin diagram of regulator IC 78XX and 79XX.
- Draw the circuit diagram of colpits oscillator. Explain its working principle. Write equation for output frequency.

3. Attempt **any four** of the following :

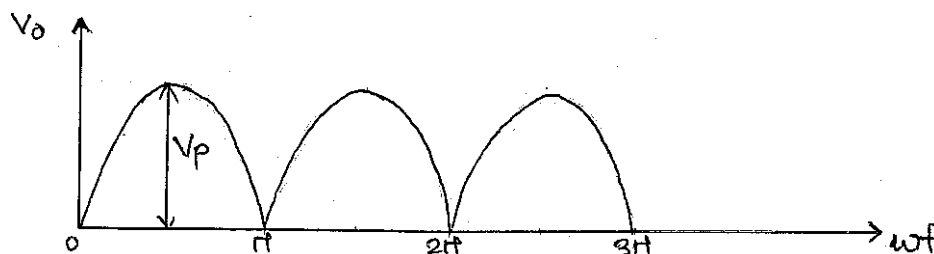
16

- Draw constructional details of Schottky diode draw its symbol and explain its working.
- Describe thermal runaway of transistor and explain how it can be avoided.
- Compare half wave, centre tap and bridge type full wave rectifier on the basis of
 - Ripple factor
 - Rectification efficiency
 - TUF
 - Waveforms.
- Draw the circuit diagram of two stage transformer coupled amplifier and describe the function of each component.
- Draw the circuit diagram of transistorized shunt regulator circuit and describe its operation.
- Draw and describe working principle of RC phase shift oscillator. Write the equation for output frequency.

4. Attempt **any four** of the following :

16

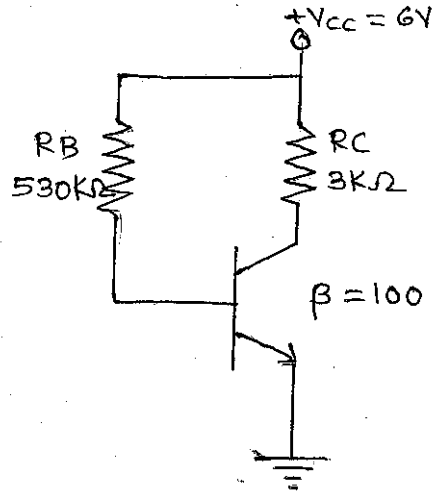
- Draw a construction of LED and explain its working.
- In full wave rectifier $V_p = 10\text{ V}$, $R_L = 10\text{ k}\Omega$ find V_{DC} , I_{DC} and ripple factor.



- Draw the circuit diagram of UJT relaxation oscillator. Sketch the output waveform and explain the operation of oscillator.
- Draw and explain constructional details of n-channel JFET.



- e) Draw a dc load line for the following circuit and determine operating point.



- f) Describe how zener diode is used as a voltage regulator.

5. Attempt **any four** of the following :

16

- Define feedback. Give the advantages of negative feedback.
- Draw a circuit diagram of class B push pull power amplifier. Sketch input and output waveform. Describe its operation.
- For a Hartley oscillator if $C = 100 \text{ pF}$, $L_1 = 30 \mu\text{H}$, $L_2 = 1 \times 10^{-8} \text{ H}$. Find the frequency of oscillation. Draw a circuit diagram of Hartley oscillator.
- Describe the working principle of enhancement type of n-channel MOSFET with diagrams.
- Using NAND gate only draw following :
 - OR gate
 - AND gate
- Describe the working of transistor as a switch with circuit diagram.

6. Attempt **any four** of the following :

16

- Draw a block diagram of regulated DC power supply and state the working of each block.
- Draw a frequency response of single stage amplifier and explain the effect of coupling capacitor and junction capacitance.
- Draw output characteristics in CE mode. Indicate DC load line with Q-point, saturation region and cut-off region.
- Derive the relation between α and β wrt BJT.
- Compare BJT and FET for four points.
- Describe EX-OR gate. Draw its symbol and Truth-table.