

17321

**21819**

**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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any TEN of the following :**

**10 × 2 = 20**

- (a) Draw symbol of Schottkey and Varactor diode.
- (b) Define (i) Ripple Factor, (ii) Rectification efficiency.
- (c) State Barkhausen's criteria.
- (d) State applications of Digital Electronics.
- (e) List any two applications of MOSFET.
- (f) Why BJT is called as bipolar junction transistor ?
- (g) State majority and minority charge carriers in P-type and N-type material.
- (h) What is the need of Filter circuit ?

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- (i) Define line regulation and load regulation.
- (j) Draw common base configuration for NPN transistor.
- (k) Convert the hex number  $(4C8.B)_{16}$  into its binary equivalent.
- (l) List the specification of zener diode.
- (m) List types of biasing circuits with respect to transistor.
- (n) List the applications of FET.

2. Attempt any FOUR of the following :

$4 \times 4 = 16$

- (a) Describe the functional block diagram of regulator IC 78XX and IC 79 XX.
- (b) Draw a neat circuit diagram of bridge rectifier with LC filter. Also. draw input, output waveforms of it.
- (c) Draw and explain V-I characteristics of P-N junction diode.
- (d) Explain working of NPN transistor.
- (e) Describe construction of N-channel D-MOSFET.
- (f) Describe fixed bias method of transistor.

3. Attempt any FOUR of the following :

$4 \times 4 = 16$

- (a) Compare P-N junction and zener diode. (any four points)
- (b) For Hartley oscillator  $C = 0.2 \mu\text{F}$ ,  $L_1 = 3.6 \text{ mH}$ ,  $L_2 = 60 \mu\text{H}$ . Calculate the frequency of oscillation.
- (c) Draw a neat labelled output characteristics of CE configuration.

- (d) Compare half-wave and full-wave rectifier on the basis of
- (i) Number of diodes
  - (ii) Ripple frequency
  - (iii) Ripple factor
  - (iv) Efficiency
- (e) Draw functional block diagram of IC723.
- (f) In half-wave rectifier the load resistance  $R_L = 2 \text{ k}\Omega$  and diode has a forward resistance of  $10 \Omega$ . The voltage across secondary winding is  $15 V_{\text{rms}}$ . Find
- (i) The peak value current ( $I_m$ )
  - (ii) The dc value of current ( $I_{\text{dc}}$ )
  - (iii) The dc voltage across load ( $V_{\text{dc}}$ )
  - (iv) Ripple factor ( $r$ )

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

**4 × 4 = 16**

- (a) Compare CB, CE & CC on the basis of
- (i) current gain
  - (ii) voltage gain
  - (iii) input impedance
  - (iv) output impedance
- (b) Draw a neat circuit diagram of centre-tap full-wave rectifier and give its working.
- (c) Implement AND, OR and NOT gate using NAND gate only.
- (d) Explain how zener diode is used as a voltage regulator.
- (e) Describe voltage divider bias method of transistor.
- (f) With neat circuit diagram explain working of RC phase shift oscillator. Also, write the formula for frequency of oscillations.

**P.T.O.**

**5. Attempt any FOUR of the following :****4 × 4 = 16**

- (a) Derive the relation between  $\alpha$  &  $\beta$  with respect to BJT.
- (b) Describe working of Colpitt's oscillator.
- (c) Compare Class A, Class B and Class C amplifiers based on any four points.
- (d) Draw and explain V-I characteristics of FET.
- (e) Convert the following hex numbers into their decimal equivalent :
  - (i)  $(2\text{ F9A} \cdot \text{B1})_{16} = (\dots)_{10}$
  - (ii)  $(\text{E B1C} \cdot \text{D4})_{16} = (\dots)_{10}$
- (f) Explain frequency response curve of two stage RC coupled amplifier.

**6. Attempt any FOUR of the following :****4 × 4 = 16**

- (a) Draw the symbol, operating principle and application of photodiode.
  - (b) Explain cross-over distortion in class-B power amplifier.
  - (c) Compare Hartley and Colpitt's oscillator. (any 4 points)
  - (d) Draw a neat diagram of Direct coupled amplifier and explain it.
  - (e) Explain transistorised voltage regulator.
  - (f) Derive the relationship between  $u$ ,  $r_d$  and  $\Omega$  with respect to JFET.
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