



17321

15116

3 Hours / 100 Marks

Seat No.

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- 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**.*

Marks

1. A) Attempt **any six** : (12)
- a) Give two example of trivalent and pentavalent impurities. 2
 - b) Draw the symbol of LED and photodiode. 2
 - c) Define α and β of the transistor. 2
 - d) State the need of biasing of BJT. 2
 - e) List two types of oscillator, which generates frequency in RF range. 2
 - f) State two advantages of digital circuit. 2
 - g) Write down output voltage for IC's 7818 and IC's 7924. 2
 - h) State any two application of zener diode. 2
- B) Attempt **any two** : (8)
- a) Draw circuit diagram and describe the working of zener diode as voltage regulator. 4
 - b) Explain construction and working principle of LED. 4
 - c) Draw output characteristic of CE configuration and show various region. 4
2. Attempt **any four** : (16)
- a) Draw the circuit diagram of bridge rectifier with π filter. Explain operation with I/P and O/P waveform. 4
 - b) Explain single stage CE amplifier with the help of circuit diagram. 4
 - c) Draw diagram of class A pushpull amplifier and explain its operation. 4
 - d) Classify rectifier and filter. 4
 - e) Explain construction and working principle of NPN transistor. 4
 - f) A multistage amplifier is consisting of three stages, each having gain of 10. What is the overall voltage gain in dB ? 4

P.T.O.

**Marks****3. Attempt any four : (16)**

- a) Compare CB, CE and CC configuration on the basis of 4
 - i) input impedance.
 - ii) current gain
 - iii) voltage gain
 - iv) output impedance.
- b) Derive the relation between α and β with to BJT. 4
- c) Draw and explain the characteristic of UJT. 4
- d) Define load regulation and line regulation for regulated power supply with the expression. 4
- e) Write important features of IC 723. 4
- f) Draw and explain the construction of n-channel JFET (FET). 4

4. Attempt any four : (16)

- a) Draw the circuit diagram of RC phase shift oscillator. Write working in steps. Give the formula of frequency of oscillation. 4
- b) In a Colpitt's oscillator, $C_1 = 0.2 \mu\text{F}$ and $C_2 = 0.02 \mu\text{F}$. If the frequency of oscillation is 10 KHz. Find the value of inductor. Also find the required gain for oscillation. 4
- c) Convert the following decimal number into equivalent binary number 4
 - a) 63.92
 - b) 109
- d) Draw the symbol, logic expression and truth table for two input of the following gates. 4
 - i) AND gate
 - ii) OR gate.
- e) Draw and explain the O/P characteristic of JFET (FET). 4
- f) Compare Hartley and Colpitt's oscillator. 4

5. Attempt any four : (16)

- a) For a PN junction diode applied voltage are 0v, +5v, -10v. Draw the PN junction indicating relative width of depletion region in each. 4
- b) A full wave rectifier uses two diodes, the internal resistance of each diode may be assumed constant at 20Ω . The transformer r.m.s. secondary voltage from center tap to each end of secondary is 50 V and load resistance is 980Ω . Find : 4
 - i) the mean load current
 - ii) the r.m.s value of load current.

**Marks**

- c) List the type of biasing circuit. Draw the diagram of voltage divider bias method and describe its operation. **4**
 - d) Draw two stage RC coupled amplifier and draw its frequency response. Show the bandwidth. **4**
 - e) Compare transformer coupled amplifier with RC coupled amplifier. **4**
 - f) Compare JFET with MOSFET. **4**
 - 6. Attempt any four :** **(16)**
 - a) Describe transistor as a switch with neat diagram. **4**
 - b) Define : **4**
 - i) Draw resistance.
 - ii) Transconductance.
 - iii) Amplification factor.
 - iv) Pinch off voltage of FET.
 - c) Draw transistorised series regulator and explain its working. **4**
 - d) Draw the block diagram for DC power supply, explain the function of each block. **4**
 - e) Write advantages and disadvantages of positive and negative feedback. **4**
 - f) a) Define junction field effect transistor (JFET) and give an example. **2**
b) Convert $(AFB2)_{16}$ to Binary number. **2**
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