B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

Programme: B.E.   Semester: I / II
Branch: Common to all Branches   Duration: 3 hrs.
Course Code: 18EC1ESECE / 18EC2ESECE   Max Marks: 100
Course: Elements of Electronics Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any may suitably assumed.

UNIT - I

1. a) Explain the forward and reverse characteristics of a Silicon Diode — **5**

   b) With a neat circuit diagram and relevant waveforms, explain the operation of bridge rectifier. — **8**

   c) Design a Zener diode voltage regulator to meet the following requirements:
   unregulated dc input voltage V_i =13 Volts to 17 Volts
   Load current I_L = 10mA
   Regulated output voltage Vo =10V
   Minimum Zener current I_{Zmin}=5 mA
   Maximum power dissipation in Zener , P_{Zmax}=500 mW — **7**

OR

2. a) Derive the efficiency of a rectifier which has a ripple factor of 1.21 and PIV of individual diode is Vm. — **6**

   b) Suggest a suitable method to reduce ripples in a rectifier circuit. — **6**

   c) A Bridge rectifier is driving a load resistance of 100 ohms.It is driven by a source voltage of 230V, 50 Hz, Neglecting diode resistances, calculate
   i) average output voltage   ii) average load current iii) frequency of output waveform iv) dc power output — **8**

UNIT - II

3. a) Explain input and output characteristics of transistor operating in common emitter configuration. — **4**

   b) A voltage divider bias circuit has V_{CC}=15V, R_C=2.7 KΩ, R_E=2.2 KΩ, R_1=22 KΩ, R_2=12 KΩ. Calculate V_E, V_C, I_C and V_{CE}. Draw the DC load line and mark the Q-point — **8**

c) Draw the circuit diagram of a Transistor amplifier which produces the following frequency response. Discuss need of all the passive elements used. **8**
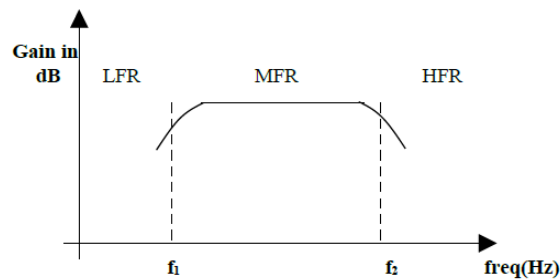
UNIT - III

4 a) Explain the working of a RC phase shift Oscillator **7**

b) In a transistor Hartley oscillator L1=5mH, L2=10mH, and C=0.01μF. Calculate the frequency of oscillations and the feedback factor. **6**

c) With a help of a neat circuit diagram explain the working of an op amp as a differentiator. Derive an expression for the output voltage. **7**

UNIT - IV

5 a) Convert the following numbers as indicated below: **6**
   i) $(365.217)_8 = (?)_2$
   ii) $(FACE)_{16} = (?)_{10}$

b) Simplify the following expression and Realize using NOR Gates only **6**
$$Y = (A+B)(A+\overline{B})(\overline{A}+B)$$

c) Explain the operation of a full-adder and realize using basic gates. **8**

OR

6 a) State and prove De-morgan's theorem **4**

b) Design a Full adder using 4:1 MUX **8**

c) With a logic diagram and Truth Table, explain the operation of JK Flip-flop **8**

UNIT - V

7 a) Explain the Transceiver system used in Digital communication using suitable block diagram. **7**

b) Discuss evaluation of cellular communication. **7**

c) Illustrate with an example the principle of operation of IOT. **6**

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