

CBCS SCHEME

18ELN14

First Semester B.E. Degree Examination, Dec.2018/Jan.2019 Basic Electronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the working of PN junction diode under forward and reverse biased conditions. (06 Marks)
- b. Explain how zener diode helps in voltage regulation with neat circuit diagram. (06 Marks)
- c. Explain with neat circuit diagram and waveforms the working of center-tap full wave rectifier. Show that efficiency of full-wave rectifier is 81%. (08 Marks)

OR

- 2 a. Explain the operation of half-wave rectifier with capacitor filter with neat circuit diagram and waveforms. (06 Marks)
- b. Show that the ripple factor of a half-wave rectifier is 1.21 and efficiency is 40.5%. (06 Marks)
- c. Explain VI characteristics of photodiode and its operation. (04 Marks)
- d. For the circuit shown in Fig.Q2(d) find (i) current and voltages in the circuit for $R_L = 450 \Omega$. (04 Marks)



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Module-2

- 3 a. Explain the drain and transfer characteristics of a JFET with neat circuit diagram. (08 Marks)
- b. Explain the basic structure and operation of JFET with neat diagrams (08 Marks)
- c. For a JFET $I_{DSS} = 9 \text{ mA}$ and $V_{GS(off)} = -8 \text{ V}_{(max)}$ determine drain current for $V_{GS} = -4 \text{ V}$. (04 Marks)

OR

- 4 a. Explain the operation of an enhancement MOSFET with neat circuit diagram. (06 Marks)
- b. Explain CMOS as an inverter with neat circuit diagram Give its equivalent circuit and its advantages. (08 Marks)
- c. Explain VI characteristics of SCR. (06 Marks)

Module-3

- 5 a. Explain the block diagram of an operational amplifier. (06 Marks)
- b. Explain the operation of an op-amp as a non-inverting amplifier with neat diagram and waveforms. (06 Marks)
- c. Define the following terms with respect to op-amp.
(i) CMRR (ii) Slewrate (iii) μp offset voltage and current (iv) μp bias current (08 Marks)

OR

- 6 a. Explain op-amp as a subtractor with neat circuit diagram. (08 Marks)
- b. Explain the different μp modes of an op-amp. (06 Marks)

- c. For an op-amp circuit shown in Fig.Q6(c), find the output V_{o1} and V_{o2} .

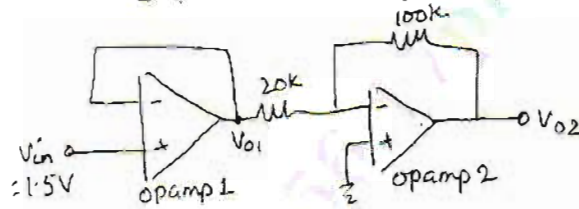


Fig.Q6(c)

Also write the function of each op-amp used.

(06 Marks)

Module-4

- 7 a. With neat circuit diagram explain how transistor is used as an voltage amplifier. Derive an equation for A_v . (08 Marks)
 b. Explain the voltage series feedback circuit and derive an equation for voltage gain A_v with feedback. (04 Marks)
 c. Explain RC phase-shift oscillator with circuit diagram and necessary equations. (08 Marks)

OR

- 8 a. With neat circuit diagram explain how transistor can be used to switch an LED ON/OFF and give the necessary equation. (08 Marks)
 b. The transistor in common emitter configuration is shown in Fig.Q8(b) with $R_c = 10\text{ k}\Omega$ and $\beta_{DC} = 200$ determine
 (i) V_{CE} at $V_{in} = 0$ (ii) $I_{B(min)}$ to saturate the collector current (iii) $R_{B(max)}$ when $V_{in} = 5V$.
 $V_{CE(sat)}$ can be neglected. (04 Marks)



Fig.Q8(b)

- c. Explain the operation of IC-555 as an Astable oscillator with neat circuit diagram and necessary equation. (08 Marks)

Module-5

- 9 a. Design Full adder circuit and implement it using basic gates. (10 Marks)
 b. Explain the basic elements of communication system with block diagram. (06 Marks)
 c. Find
 (i) $(1010111011110101)_2 = (?)_{16}$ (ii) $(FA876)_{16} = (?)_2$ (04 Marks)

OR

- 10 a. State and prove De Morgan's theorems. (04 Marks)
 b. Explain the working of a 3-bit ripple counter with neat circuit diagram and timing diagrams. (08 Marks)
 c. Explain the working of RS flip flop with truth table and diagram. (06 Marks)
 d. Subtract the following using 2's complement:
 (i) $11100 - 10011$ (02 Marks)
