USN

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 RL = 450 O.

V .n...- Pi__. ii **9) _a---'**

(04 Marks)

Fig.Q2(d)

Module-2

3 a. Explain the drain and transfer characteristics of a JFET with neat circuit diagram. **(08 Marks)**

h. Explain the basic structure and operation of JFET with neat diagrams. **(08 Marks)**

c. For a JFET IDss = 9 mA and VGso)fr) = _ 8 $V_{(rnax)}$ determine drain current for VGS = — 4V. **(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)**

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) pp offset voltage and current) pp bias current **(08 Marks)**

OR

6 a. Explain op-amp as a subtractor with neat circuit diagram. (08 Marks)

b. 'Explain the different iv modes of an op-amp. (06 Marks)

c. For an op-amp circuit shown in Fig.Q6(c), find the output Vo 1 and Vo 1.

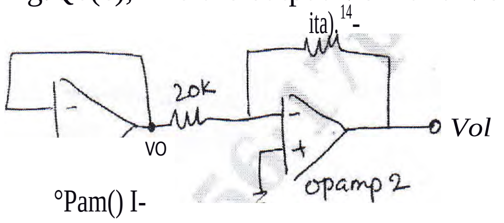

Fig.Q6(c)

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. **(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 ana give the necessary equation. **(08 Marks)**

b. The transistor in common emitter configuration is shown in Fig.Q8(b) with It_c = 10 kfl and PDC = 200 determine

(i) VCE at $V_{i„}$ = 0 (ii) IB(min) to saturate the collector current (iii) Rti(nax) when Vi_n = 5V. Vcr(.1) can be neglected. **(04 Marks)**

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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) $(1010111011110101)_2 = (\ ?\ )_6$ (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)**