Total No. of Printed Pages: 4

F. E. Semester –II (Revised Course 2016-17)
EXAMINATION OCTOBER 2020
Fundamentals Of Electronics And Telecommunication Engineering

[Duration : Two Hours] **[Total Marks : 60]**

Instructions:
1) Answer THREE FULL QUESTIONS with ONE QUESTION FROM EACH PART.
2) Assume suitable data if necessary.
3) Figures to the right indicate full marks.

Part –A

1. a) With the help of neat sketch explain forward biasing of PN junction diode. Also define knee voltage of a diode. 7
   b) Differentiate between Avalanche and Zener breakdown. 3
   c) Over what range of input voltage will the Zener circuit shown in figure 1(c) maintain 30 V across a 2k load, assuming that series resistance R= 200Ω and Zener current rating is 25 mA? 5

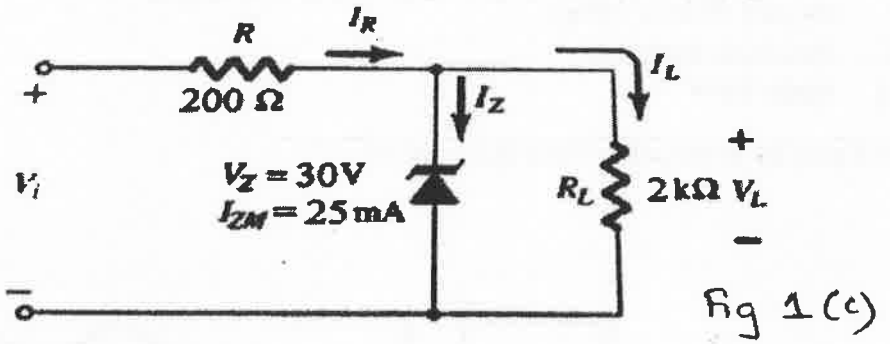

Fig 1(c)

   d) Derive an expression for the output voltage (v_{dc}) and peak inverse voltage (PIV) of centre tapped full wave rectifier. 5

2. a) With the help of a neat diagram explain the construction of N- channel JFET. Also draw the drain /output characteristics for the same. 7
   b) Derive the relation between leakage currents of CB(I_{CBO}) and CE(I_{CEO}) configuration. 3
   c) For the emitter- bias network shown in Fig2(c) ,determine: 5
      (i) I_B
      (ii) I_C
      (iii) V_{CE}
      (iv) V_C
      (v) V_{BC}

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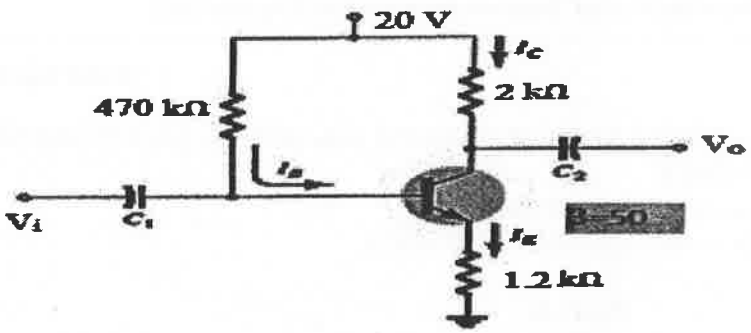

Fig 2(c)

d) With the help of neat diagram explain how Complementary MOSFET (CMOS) can be used as an inverter. 5

3. a) Explain different types of atomic bonds. 4

b) In the bridge type circuit shown in Fig.3(b), the diodes are assumed to be ideal. Find: 6

(i) the d.c. output voltage

(ii) the peak inverse voltage

(iii) the output frequency

(iv) ripple factor.

Assume primary to secondary turns ratio to be 4:1

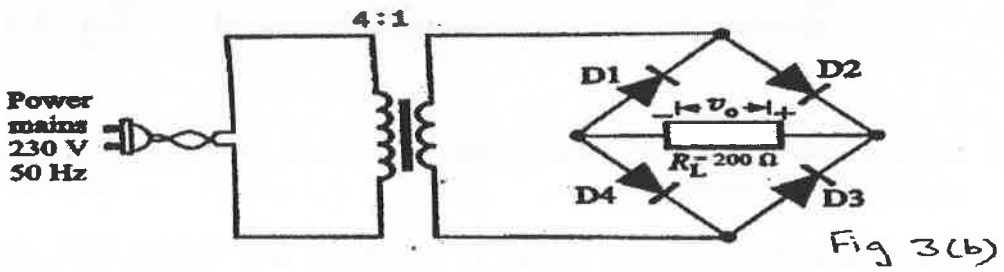

Fig 3(b)

c) Why is the Fixed Bias Circuit not commonly used? 4

d) With the help of a neat diagram explain the construction of N-channel Depletion MOSFET. 4

e) What are the advantages of FET over BJT? 2

Part –B

4. a) With the help of a two-transistor model, explain the working of a Silicon Controlled Rectifier. 5

b) Explain the following:
   i) Common Mode Rejection Ratio(CMRR) 5
   ii) Slew Rate

c) State the following Boolean Laws and prove them using the Truth Table method: 5
   (i) Association Law
   (ii) Absorption Law

d) Draw the Logic Symbols, construct Truth Tables, and with the help of circuit diagrams, explain the working of: 5
   (i) AND
   (ii) NOT

5. a) Explain the working principle of Piezoresistive strain gauge. 4

b) What is PLC? How is it different from a computer? 4

c) Explain the following steps involved in the manufacturing of a single-sided Printed Circuit Board: 6
   (i) Artwork Generation
   (ii) Etching
   (iii) Coating

d) Explain the need for modulation in a communication system with respect to the following: 6
   (i) Multiplexing
   (ii) Practicability of antennas
   (iii) Narrowbanding

6. a) With the help of a neat circuit diagram of an inverting amplifier using op-amp give the expression for its Closed Loop Voltage Gain. 3

b) Two square waves , A of 1 KHz and B of 2 KHz frequency are applied as input to the following Logic Gates. Draw the waveform in each case. 2
   (i) AND Gate
   (ii) XNOR Gate

c) With the help of logic diagrams , implement the following logic using NOR gate: 5
   (i) AND Gate
   (ii) OR Gate
   (iii) NOT Gate

d) Differentiate between a microprocessor and microcontroller. 4

e) What are transducers? How can these be classified as modulating and self- generating transducers? Explain with the help of examples. 6

Part –C

7.	a)	Explain N type semiconductor materials with the help of a neat diagram.	5
	b)	With the help of a neat diagram explain how a BJT in Common Base (CB) configuration can be used as an amplifier.	5
	c)	Draw the pin configuration of IC 741, and explain the use of each pin.	5
	d)	With the help of neat sketches explain the construction, working and characteristics of LDR.	5
8.	a)	Draw and explain V-I characteristics of an ideal diode.	4
	b)	Why is Emitter Stabilized Bias Circuit an improvement over Fixed Bias Circuit?	6
	c)	State the following Boolean Laws and prove them using the Truth Table method: (i) Commutative Law (ii) Distributive Law	5
	d)	With the help of a neat diagram explain the process of image transfer of artwork on to the board during the manufacture of a single –sided PCB	5