Total No. of Printed Pages:3

F.E. Semester- II (Revised Course 2016-17)
EXAMINATION AUGUST 2021
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 right indicate full marks.

PART – A

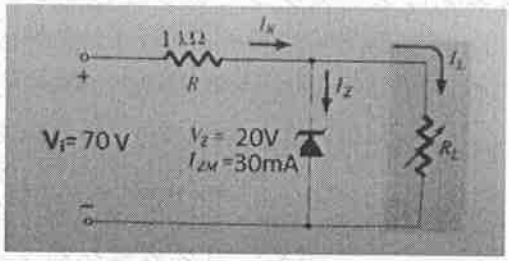
Q.1

a) With the help of neat sketch explain reverse biasing of PN junction diode. 5

b) Draw the V/I characteristic of Ge diode and explain the term threshold or knee voltage. 5

c) Differentiate between half wave rectifier and a center-tapped full wave rectifier. 5

d) For the network shown below, determine the range of $R_L and\ I_L$ that will result in VR_L being maintained at 20 V. 5



Q.2

a) Drive the relation between leakage currents of CB(I_{CBO}) and CE(I_{CEO}) configuration. A certain transister has α_{dc} of 0.98 and a collector leakage current I_{co} of $1\mu A$. Calculate the collector and the base currents, when $I_E = 1mA$. 5

b) With the help of a neat circuit diagram explain the output characteristics of a npn BJT connected in common Emitter (CE) configuration. 5

c) What is a biasing circuit and what area the requirements from a biasing circuit? 5

d) For the emitter-bias network shown below, determine : 5
i) I_B
ii) I_C
iii) V_{CE}
iv) V_C
v) V_{BC}

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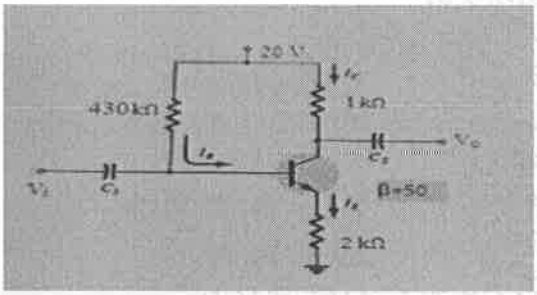

Q.3 a) Derive an expression for the rectification efficiency of a full wave bridge rectifier. 5

b) Explain different types of atomic bonds. 5

c) With the help of a neat diagram explain the construction of P-channel JFET. 5

d) What are the various ways in which transfer characteristics of a JEFT can be plotted? 5

PART – B

Q.4 a) Draw the pin configuration of IC 741, and explain the use of each pin. 5

b) With the help of neat diagram, explain the circuit of a inverting amplifier using opamp and give the expression of its closed loop voltage Gain. 5

c) State the associative Law of Boolean Algebra and prove it using the truth Table method 5

d) Draw the symbol of SCR and with the help of a neat diagram explain the construction of Silicon Controlled Rectifier. 5

Q.5 a) With the help of neat sketches explain the construction, working and characteristics of light dependent resistor (LDR). Also give an application of LDR. 5

b) With the help of neat block diagram explain the components of PLC. 5

c) What is printed circuit board? What are the advantages of having a PCB over point to point soldered circuit? 5

d) With the help of waveforms, explain the basic concept of amplitude modulation. 5

Q.6 a) Two square waves, A of 1 KHz and B of 2 KHz frequency are applied as input to the following logic gates. Draw the output waveform in each case. 5
i) NAND Gate
ii) XOR Gate

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b) With respect to op-amp explain the term common mode rejection Ratio. Also explain what is the need of feedback in an op-amp? 5

c) Explain the working principle of piezoresistive gauges. 5

d) With the help of a flowchart give the steps involved in design and fabrication of single sided PCB. 5

PART – C

Q.7 a) A crystal diode having internal resistance $r_d = 20$ is used for half wave rectification. If the applied voltage v=50 sin wt and load resistance $R_L = 800$ ohms find: 5

i) Im,Idc ii) A.C. power input and D.C. power output iii) D.C. output voltage

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

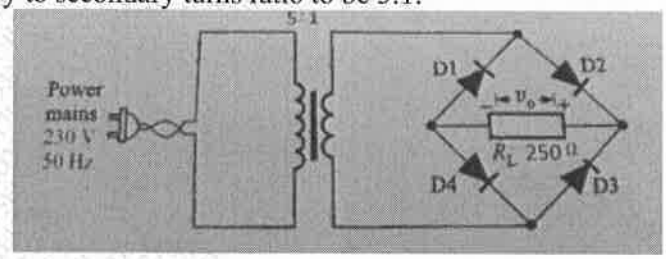
c) With the help of neat diagram explain the characteristics of an SCR. 5

d) What is a programmable Logic Controller? 5

Q.8 a) In the bridge rectifier circuit shown in figure below, the diodes are assumed to be ideal find : 5

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 5:1.



b) Differentiate between emitter, base and collector region of transistor. 5

c) With the help of logic diagrams, explain NOR gate is called as an Universal Gate. 5

d) Explain the following steps involved in the manufacturing of a single –sided printed circuit Board : 5

i) Artwork Generation
ii) Panel preparation

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