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Total Number of Pages : 03

B.Tech.
15BE2101

2nd Semester Back Examination 2017-18
BASICS OF ELECTRONICS
BRANCH : AEIE, AERO, AUTO,
BIOMED, BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC,
FASHION, FAT, IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH, METTA,
METTAMIN, MINERAL, MINING, MME, PE, PLASTIC, TEXTILE
Time : 3 Hours
Max Marks : 100
Q.CODE : C920

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Part – A (Answer all the questions)

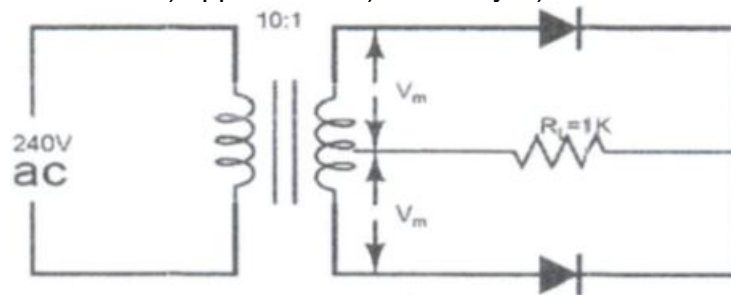
- Q1 Answer the following questions: *multiple type or dash fill-up type* : (2 x 10)**
- a) In a BJT with $\beta = 100$, α equals
 - (a) 0.99 (b) 99
 - (c) 1 (d) 1.01
 - b) Avalanche breakdown results basically due to
 - (a) impact ionisation
 - (b) strong electric field across the junction
 - (c) emission of electrons
 - (d) rise in temperature
 - c) For an Op-amp with negative feedback, the output is
 - (a) equal to the input (b) increased
 - (c) fed back to the inverting input (d) fed back to the noninverting input
 - d) Which number system has a base of 16
 - (a) Decimal (b) Octal
 - (c) Hexadecimal (d) Binary
 - e)gates are known as universal gate.
 - f) A constant current source supplies a current of 300 mA to a load of 1 Kohm. When the Load is changed to 100 ohm, the load current will be
 - (a) 3 Amp (b) 300 mAmp
 - (c) 30 mAmp (d) 600 mAmp
 - g) The Op-amp can amplify
 - (a) a.c. signals only (b) d.c. signals only
 - (c) both a.c. and d.c. signals (d) neither d.c. nor a.c. signals
 - h) An oscillator employs feedback
 - (a) Positive (b) Negative
 - (c) Neither positive nor negative (d) Data insufficient
 - i) The forward voltage drop across a silicon diode is about
 - (a) 1.2V (b) 0.3V
 - (c) 0.7V (d) 1.0V
 - j) The doping level in a zener diode is that of a crystal diode
 - (a) the same as (b) less than
 - (c) more than (d) none of the above

Q2 Answer the following questions: short answer types: (2 x 10)

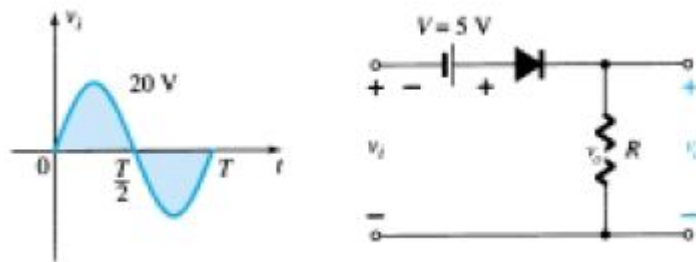
- a) Give the load line of a BJT amplifier if $v_{cc} = +9V$ and $R_c = 1.8K\Omega$.
- b) Explain Early effect of BJT.
- c) Differentiate between zener breakdown and avalanche breakdown.
- d) What is Bark Hausen criteria?
- e) Difference between Practical Op-amp and Ideal Op-amp.
- f) Draw the V-I characteristic of Zener diode.
- g) Implement Half Adder using AND and OR gate.
- h) State De-Morgan's theorem.
- i) What is the relationship between period of waveform and frequency?
- j) What will appear on the screen of CRO when time base voltage is given to Y-plate and pulse is given to X-plate? justify?

Part – B (Answer any four questions)

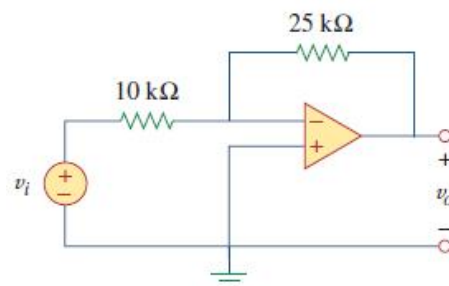
- Q3 a)** With neat circuit diagram explain the working principle of Full wave center-tapped transformer rectifier and derive the expression for its efficiency. **(10)**
- b)** In the center tap fullwave rectifier shown below, find i) peak, average, rms value of load current ii) ripple factor iii) efficiency iv) PIV **(5)**



- Q4 a)** With neat diagram explain the formation of a potential barrier in a p-n junction and show the polarity of the Barrier potential and draw the V-I characteristic of p-n junction diode. **(10)**
- b)** Determine the output waveform of the circuit given below. Assume ideal diode. **(5)**



- Q5 a)** Realize Op-amp as adder, subtractor, buffer, integrator and differentiator circuit. **(10)**
- b)** In the fig. given below if $v_i = 0.5V$, calculate the output voltage v_o and the current in $10K\Omega$ resistor. **(5)**



- Q6** a) With a neat diagram explain the basic operation of bipolar junction transistor. Draw its input and output characteristic and briefly explain why biasing is needed? (10)
b) Explain how BJT is converted to hybrid- π model and why modeling is needed? (5)
- Q7** a) With a neat block diagram explain the operation of cathode ray tube(CRT), and how phase measurement can be done using an Oscilloscope through the Lissajous method? (10)
b) Write down a short note on Wien-Bridge Oscillator. (5)
- Q8** a) Realize Full adder using NAND Gate, NOR Gate and Multiplexer. (10)
b) Perform the following conversion: (5)
i) $(142.623)_{10} = ()_2$ ii) $(BPUT.2018)_{16} = ()_8$ iii) $(BPUT.2018)_{16} = ()_{10}$
iv) $(100100111001.1001)_2 = ()_{16}$
- Q9** a) State De-Morgan's theorem. Convert the Boolean function $Y = \overline{A}B + BC + \overline{A}C$ into canonical forms. (10)
b) Apply De-Morgan's law and minimize the expressions: (5)
i) \overline{ABCD} ii) $\overline{A+B+C+D}$ iii) $\overline{\overline{ABCD}}$ iv) $\overline{A+B+C+D(E+F)}$