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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)

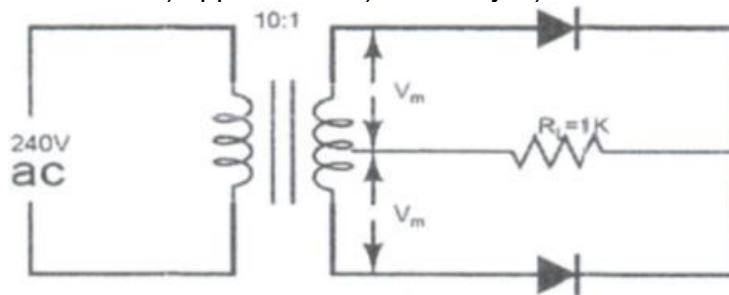
- a) In a BJT with $\beta = 100$, α equals
(a) 0.99 (b) 99
(c) 1 (d) 1.01
- b) Avalanche breakdown results basically due to
(a) impact ionisation
(b) strong electric field across the junction
(c) emission of electrons
(d) rise in temperature
- c) For an Op-amp with negative feedback, the output is
(a) 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)

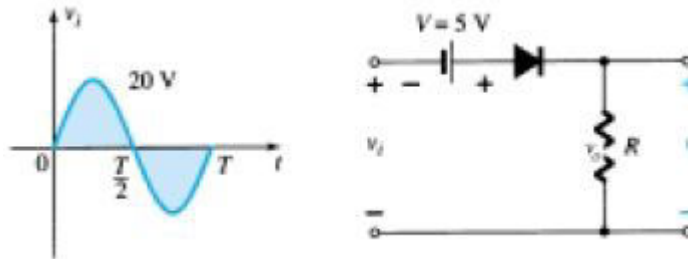
- Give the load line of a BJT amplifier if $v_{cc} = +9V$ and $R_c = 1.8K\Omega$.
- Explain Early effect of BJT.
- Differentiate between zener breakdown and avalanche breakdown.
- What is Barkhausen criteria?
- Difference between Practical Op-amp and Ideal Op-amp.
- Draw the V-I characteristic of Zener diode.
- Implement Half Adder using AND and OR gate.
- State De-Morgan's theorem.
- What is the relationship between period of waveform and frequency?
- 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)

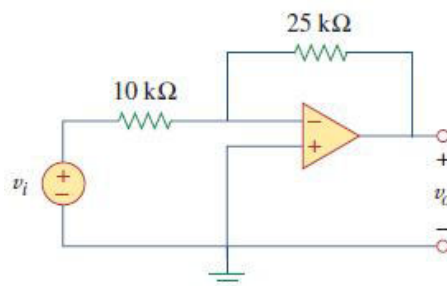
- Q3 a)** With neat circuit diagram explain the working principle of Full wave center-tapped transformer rectifier and derive the expression for its efficiency. **(10)**
- b)** In the center tap fullwave rectifier shown below, find i) peak, average, rms value of load current ii) ripple factor iii) efficiency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



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- 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)**

- 210 210 210 210 210 210 210 210
- 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) $\overline{A+B+C} + D(\overline{E+F})$