Total No. of Questions : 12] [Total No. of Printed Pages : 4

[3561]-204

F. E. (Semester - II) Examination - 2009

BASIC ELECTRONIC ENGINEERING

(June 2008 Course)

Time : 3 Hours] [Max. Marks : 100

Instructions :

*(1) Answer **any three** questions from each section.*

*(2) Answer to the **two sections** should be written in **separate answer-books.***

(3) Figures to the right indicate full marks.

(4) Neat diagram must be drawn wherever necessary.

(5) Use of electronic pocket calculator is allowed.

(6) Assume suitable data, if necessary.

SECTION - I

Q.1) (A) A Si PN-junction has a reverse saturation current of I_o = 30nA at a temperature of 300° k. Calculate the junction forward voltage required to produce a current of

(1) 0.1 mA

(2) 10 mA [06]

(B) Draw a neat circuit diagram of a Bridge Rectifier with Capacitor Filter and explain its operation with appropriate waveforms. Give the equation of output voltage with and without capacitor filter. [08]

(C) Justify following in one sentence : [04]

(1) In what bias condition is an LED normally operated ?

(2) What happen to the light emission of an LED as the forward current increases ?

OR

Q.2) (A) Explain following rectifier diode specifications : **[06]**

(1) V_R

(2) I_O

(3) I_{FSM}

(4) I_{FRM}

(B) Determine the minimum and maximum load current for which the zener diode in fig. 1 will maintain regulation. What is the minimum value of R_L can be used ?

$V_Z = 12V$, $I_{ZK} = 1mA$, $I_{ZM} = 50mA$

Assume $Z_Z = 0\Omega$ and V_Z remains constant 12V over the range of current values. **[06]**

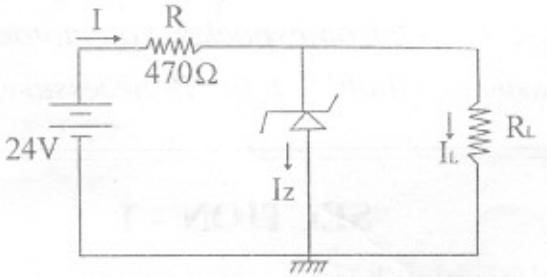

Fig. 1

(C) Write short notes : **[06]**

(1) Bar Graph

(2) Matrix Display

Q.3) (A) Determine the co-ordinates of operating point for the circuit, shown in fig. 2 **[06]**

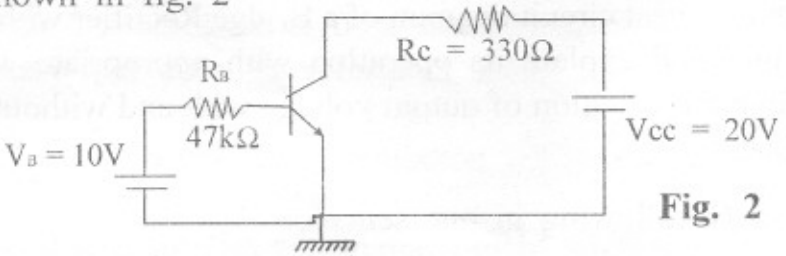

Fig. 2

(B) Draw constructional details and explain operation of p-channel MOSFET. **[06]**

(C) Why CC and CB configurations are not preferred for BJT as a switch ? **[04]**

OR

Q.4) (A) Explain constructions working and V-I characteristics of TRIAC. [06]

(B) Calculate the values of Ic and I_E for a BJT with $\alpha_{dc} = 0.97$ and $I_B = 50\ \mu A$. Determine β_{dc} for the device. [04]

(C) Discuss the effect of following capacitors on frequency response of amplifier : [06]

(1) Coupling Capacitor

(2) Bypass Capacitor

(3) Diffusion and Transition Capacitor

Q.5) (A) In the noninverting summing amplifier $V_1 = 2V$, $V_2 = 4V$, $V_3 = 5V$. Input resistors for all three input signals are same and are equal to 1 kΩ, the feedback resistor R_f is 2 kΩ.

(1) Draw neat circuit diagram.

(2) Find Output Voltage. [06]

(B) Draw a neat circuit diagram of square wave generator using OP-Amp and explain its operation with the help of voltage waveform across output and timing capacitor. Give the equation of output frequency. [06]

(C) List the advantages of Negative and Positive Feedback. [04]

OR

Q.6) (A) For the inverting amplifier using OP-Amp if $R_f = 100k\Omega$; $R_1 = 10k\Omega$, $Vcc = \pm 10V$, $Vi = 2V$ d.c. Calculate : [06]

(1) Output Voltage

(2) Is the result in part (1) is practically possible ? Justify.

(B) Draw neat circuit diagram of an ideal integrator and explain its operation. Give the drawbacks of this circuit. How they are overcome in practical integrator ? [06]

(C) What element determines the constant of proportionality that relates input Current to output Voltage in the Current to Voltage Converter ? Justify your answer. [04]

SECTION - II

Q.7) (A) Write a short note on various classification of IC Technologies. [05]

(B) Draw and explain the operation of following gates using CMOS : [06]

(1) NAND

(2) OR

(C) What do you mean by Counter ? Compare synchronous and Asynchronous Counter. [05]

OR

Q.8) (A) State and prove Demorgan's Theorm. [04]

(B) Draw the diagram of 8:1 Mux. What is the relation between number of select lines and inputs ? Give applications of Multiplexers. [06]

(C) Draw and explain the block diagram of Microprocessor. [06]

Q.9) (A) Draw a neat diagram of Digital Thermometer and explain its operation. [05]

(B) Explain different characteristics of Transducers. [05]

(C) Write a short notes : [06]

(1) PID Controller

(2) DATA Logger

OR

Q.10) (A) Explain in brief, different types of Strain Guages. [06]

(B) Write a short note on TWO Wire Transmitter. [04]

(C) What is Piezoresistivity ? Explain the operation of transducer working on piezoresistivity principle. State its advantages and disadvantages. [06]

Q.11) (A) Draw and explain Superhetrodyne Receiver 2. [06]

(B) Write a short note on RG Standard of Cable. [06]

(C) Write the expression of Amplitude Modulation. Define Modulation Index and draw Waveform of AM. [06]

OR

Q.12) (A) What is the need of Modulation ? Explain. Give comparison between AM and FM. [06]

(B) Draw and explain block diagram of Mobile Communication System. [06]

(C) Write short notes : [06]

(1) Fiber Optic Cable

(2) Coaxial Cable
