* R R - 0 8 5 7 / 3 0 0 *

RR-0857

Third Year B. Sc. Examination

March / April – 2010

Electronics (ID)

(Can Course)

(New Course)

Time : **3** Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ T. Y. B. Sc.

Name of the Subject :

☛ Electronics (ID) (Can) [NEW]

☛ Subject Code No. : 0 8 5 7 ☛ Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

(2) Draw neat diagram wherever necessary.
(3) Symbols used in the question paper have their usual meaning.
(4) Figures to the right indicate full marks of the question.
(5) Scientific calculator may be used.

1 Answer the following questions in short : **14**

(i) Calculate the efficiency of transformer coupled class A amplifier for a supply of 12V and output voltage $V_P(L) = 12V$.

(ii) Define CMRR and slew rate.

(iii) State three application of a thermistor.

(iv) Draw the circuit diagram of colpits oscillator.

(v) What are the different characteristic of op-amp.

(vi) Voltage shunt feedback having $z_i = 20k\Omega$, and $z_{if} = 5k\Omega$. Calculate output impedence with feedback if output impedence with feedback if output impedence is $30k\Omega$.

(vii) What is maximum closed loop gain for an op-amp having slew rate $2.4V/\mu s$ when input signal varies by 0.3V in $10\mu s$.

2 (a) Explain class B amplifier operation. Obtain an equation for its efficiency and show that maximum efficiency is 78.5%. 7

(b) Calculate the efficiency of a class B amplifier for a supply voltage of $V_{cc} = 24V$, with peak to peak output load voltage of (i) 44 volts and (ii) 12 volts. 4

OR

2 (a) Explain the method used to categorize amplifier on the basis of class. 7

Draw the diagram of series fed class A amplifier and explain its DC and AC operation.

(b) Calculate the efficiency of a transformer coupled class A amplifier for a supply 12V and outputs of 4

(i) $V_{L_{(PP)}} = 24V$ and

(ii) $V_{L_P} = 6V$

3 (a) Explain how the stability of a feedback amplifier can be investigated using Nyquist method. 7

State advantage and disadvantage of negative feedback.

(b) Determine the feedback gain, gain with feedback and output resistance for the voltage series feedback if 4

$R_i = 1k\Omega$, $A = -50$, $R_{if} = 6k\Omega$ and $R_{of} = 6.67k\Omega$.

OR

3 (a) Explain the Wein-bridge oscillator with circuit diagram. 7

Also explain FET phase shift oscillator with circuit diagram.

(b) Calculate the frequency for FET colpits oscillator circuit having the component values $L_{Rfc} = 0.5mH$, $L = 100\,\mu H$ $C_1 = 0.005\,\mu F$, $C_2 = 0.01\,\mu F$ and $C_c = 10\,\mu F$. 4

4 (a) What is op-amp ? What is open loop gain in op-amp. Explain the use of op-amp as **7**

(i) Inverting amplifier and

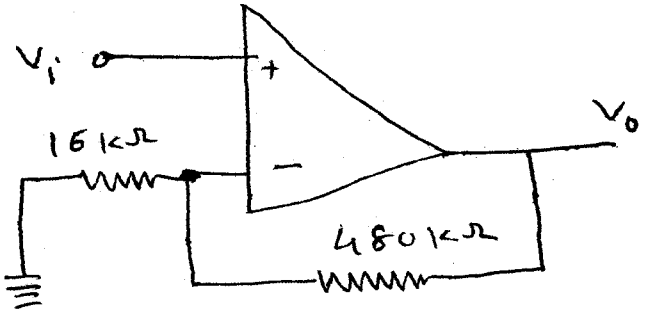
(ii) Summing amplifier.

(b) Calculate the CMRR in dB for the circuit measurements of $v_d = 1\,mV;\ v_o = 120mV$ and $V_c = 1mV; V_o = 20\,\mu V$. **4**

OR

4 (a) Draw the basic block diagram of op-amp and explain the function of each block. **7**

(b) What input (V_i) must be applied to input of given circuit to result an output of $-9.3V$? State the polarity of applied voltage. **4**



5 (a) Explain amplitude modulation in detail. What is modulation factor ? Explain following case of modulation. **7**

(i) 00 %

(ii) 50 %

(iii) 100 %

(iv) 150 %

(b) A carrier of 150V and 200 kHz is modulated by 70V, 200Hz sinewave signal. Calculate frequency components of modulated wave along their amplitude. **4**

OR

5 (a) What are the functions of radio receiver ? Give detail notes on straight radio receiver and supper-heterodyne receiver with proper diagram. **6**

(b) Describe the construction of UJT with its symbol. Draw and explain UJT emitter characteristic. **5**

6 Answer any **two** of the following : **14**

(a) Describe the construction and basic operation of SCR giving necessary diagram the operation of SCR on the basis of two transistor analog.

(b) Explain the use of diac in proximity detector.

(c) Write a short note on varactor diode.

(d) Describe how the construction and application of hot carrier diode are significantly different from those of conventional semiconductor diode.