GANPAT UNIVERSITY

B.TECH SEM. III - MECHATRONICS ENGINEERING
CBCS REGULAR EXAMINATION NOV/DEC - 2012
2MC305/MC304 ANALOG CIRCUITS & DEVICES

Time: 3 Hours   Total Marks: 70

Instructions:

1). All questions are **compulsory**.
2). Figures to the **right** indicate full marks.
3). Answers to the two sections must be written in **separate** answer books.
4). Assume all necessary data.

Section - I

Que:-1 Attempt All.   [12]

(A) Explain the differentiator.
(B) Explain the square wave generator.
(C) Draw the equivalent circuit of an Opamp and ideal voltage transfer curve and Write down the characteristics of the ideal Opamp.

OR

Que:-1 Attempt All.   [12]

(A) Explain summing and averaging amplifier using non-inverting configuration.
(B) Explain the phase shift oscillator.
(C) Explain the DC voltmeter.

Que:-2 (A) Explain the Sample and Hold circuit using Opamp.   [06]
       (B) Explain the square wave oscillator using 555 timer.   [05]

OR

Que:-2 (A) Prove that gain of differential amplifier is same as gain of inverting amplifier   [07]
       (B) Explain the pulse stretcher using 555 timer.   [04]

Que:-3 Attempt All.   [12]

(A) For loaded differential amplifier, $\beta = 200$, $Rc = 7.5 K\Omega$, $R_E = 7.5 K\Omega$, $Vcc = +15V$, $V_{EE} = -15V$, $R_L = 15K\Omega$, $V_1 = 10mV$, $V_2 = 0$ V.
Find load current and load voltage.

(B) For the voltage follower amplifier having a parameter connected with it is as following,
$R_1 = 1K\Omega$, $R_F = 10K\Omega$, $A = 200000$, $Ri = 2M\Omega$, $Ro = 75\Omega$, $f_0 = 5Hz$,
Supply voltage $= \pm 15V$, o/p voltage swing $= \pm 13V$.
Calculate A_F, R_{iF}, R_{oF} and f_F.

(C) Explain following terms.
1. Input offset Current.
2. Large Signal Voltage gain.
3. CMRR.
4. Power consumption.

Section – II

Que:-4 **Attempt All.** [12]

(A) Analyze VDB amplifier using π model.
(B) Explain variation in current gain in a
(C) What do you mean by distortion of signals? Explain swing of Q-point.

OR

Que:-4 **Attempt All.** [12]

(A) How any amplifier can be converted in π model for AC analysis?

(B) How to create set of collector curves and load line? Explain importance of Q pint.

(C) Explain the procedure to recognize saturation with example.

Que:-5 **(A)** Explain Zero crossing detectors with figure. [06]
(B) How capacitive, transformer and direct couplings are different? Explain with figure. [05]

OR

Que:-5 **(A)** Explain multistage amplifier and swamped amplifier. [06]
(B) Differentiate between class A, class B and class C operations. [05]

Que:-6 **Attempt Any Three.** [12]

(A) If C=22 µF, R=2.3 KΩ and frequency varies from 22 Hz to 20 KHz, than check Whether it is good coupling or not, if it is not than what can be done?

(B) In CE amplifier R_C=10 KΩ, R_B =100 KΩ, V_{CC}= +20 V, V_{BB}= +10 V and β_{DC}=60, find in which region transistor is operating?

(C) For an Emitter bias circuit R_C=1 KΩ, R_E =2.2 KΩ, V_{CC}= +15 V, V_{BB}= +6 V and β_{DC}=110, find location of Q-point.

(D) For VDB amplifier R_1 =10 KΩ, R_2 =2.2 KΩ, R_C=3.6 KΩ, R_E =1 KΩ, V_{CC}= +10 V, β_{DC}=200, check whether it is Stiff voltage divider or not?

END OF PAPER