GANPAT UNIVERSITY
B.TECH SEM. IV ELECTRONICS & COMMUNICATION ENGINEERING
CBCS REGULAR EXAMINATION, April - June 2015
2EC403 ANALOG ELECTRONICS

TIME: 3 Hrs.]   [TOTAL MARKS: 70

INSTRUCTIONS:
1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

1 (A) Draw pin diagram of IC 741 and explain each pin in detail. 4
  (B) What is UGB? How it is related with fF for non-inverting amplifier with feedback. 4
  (C) Give the difference between open loop op-amp and closed loop op-amp circuit. 4

OR

1 (A) List ideal op-amp characteristics and draw equivalent circuit of op-amp. 4
  (B) Define following OP-AMP related terms and explain each in brief. (any six) 6
    1. Input offset voltage
    2. CMRR
    3. SVRR
    4. Output short circuit current
    5. Transient Response
    6. Slew Rate
    7. Channel Separation
  (C) Explain concept of virtual ground for op-amp circuit. 2

2 (A) For the 714C OP-AMP inverting amplifier circuit with R1=150Ω, RF=4.7kΩ, A=4×10^5, Ri=38MΩ, Ro=55Ω,f$_0$=5Hz. Supply voltage= ±15V. Max. Output voltage swing=±13V, Calculate A$_F$, R$_{iF}$, R$_{oF}$, f$_F$, and V$_{OOT}$. 4
  (B) Prove that gain of the differential amplifier with single OP-AMP is same as that of the inverting amplifier. 4
  (C) Write a short note on instrumentation amplifier. 4

OR

2 (A) Design first order low pass filter at a cutoff frequency of 1KHz with a pass band gain of 2. Also using frequency scaling technique, convert 1 KHz cutoff frequency to new cut off frequency of 0.8 KHz. 4
  (B) Write a short note on schmitt trigger circuit. 4
  (C) Explain comparator circuit. How it can be used as a zero crossing detector? 4

3 (A) Explain summing, scaling and averaging amplifier in inverting configuration. 6
  (B) Derive the equation of open loop voltage gain as a function of frequency and write expression of magnitude and phase angle of the same. 3
  (C) Draw the circuit of 2nd order high pass butter worth filter. 2

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SECTION-II

4 (A) Give the classification of basic amplifier without feedback and compare characteristics. — 6

(B) Calculate A_{vf}, R_{if}, R_{of}, R'_{of} for the emitter follower circuit shown in figure (a). Assume $h_{re}=h_{oe}=0$, $h_{ie}=1.1k\Omega$, $h_{fe}=50$, $R_s=R_L=10K\Omega$, $R_e=1K\Omega$. — 6

OR

4 (A) An amplifier with open loop voltage gain $A_v = 1000 \pm 100$ is available. It is necessary to have an amplifier whose voltage gain varies by no more than ± 0.1 %. Find the gain with feedback and feedback factor β. — 3

(B) Explain the effect of negative feedback on voltage gain and stability in feedback amplifier. — 3

(C) Derive input resistance R_{if}, Output resistance R_{of} without load resistance and Output resistance R'_{of} with load resistance of voltage shunt feedback amplifier with negative feedback. — 6

5 (A) Explain Phase locked loop using block diagram. — 4

(B) Explain working of astable multivibrator design using timer IC-555. Write the T_{on}, T_{off} and duty cycle equation. — 7

OR

5 (A) Define the following term for time-base generators. — 2

(i) Sweep-speed error

(ii) Transmission error

(B) Calculate the ON times, OFF times and duty cycle of the load voltage waveform for an astable multivibrator design using IC-555 shown in figure(b), the external components are $R_A= 25K\Omega$, $R_B= 33K\Omega$ and $C = 0.5uF$. — 4

(C) Explain different types of multivibrators with waveform. Also list its applications. — 5

6 (A) Calculate the ON time of the load voltage waveform of Monostable multivibrator shown in figure (c), the external components are $R_A= 15K\Omega$ and $C= 0.1\mu F$. — 2

(B) Using block diagram explain the working principle of series voltage regulator. — 5

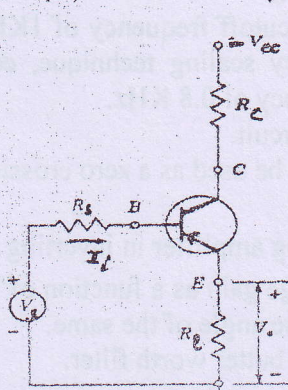(C) Draw and explain Oscillator with LC feedback circuits. — 5
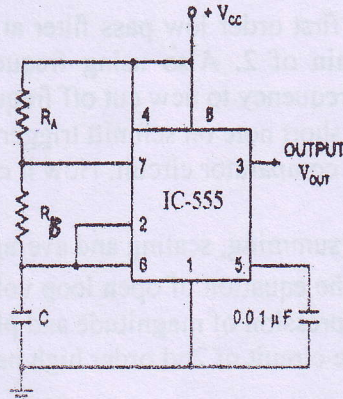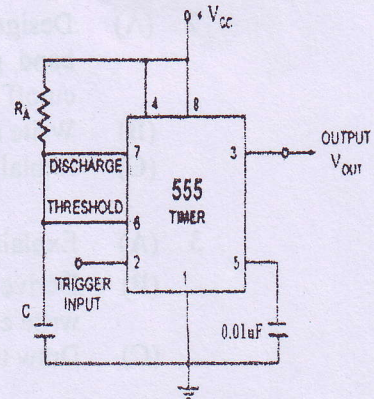

Figure (a)   Figure (b)   Figure (c)

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