Exam No: _____

GANPAT UNIVERSITY

B. TECH SEM- III (MC) REGULAR EXAMINATION– NOV-DEC 2015

2MC301: Analog Circuits & Devices

TIME: 3 HRS **TOTAL MARKS: 60**

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION: I

Q.1

A. Explain Twin-T oscillator. (04)

B. Explain monostable operation mode in 555 timer. (03)

C. Explain the Schmitt trigger using OPAMP. (03)

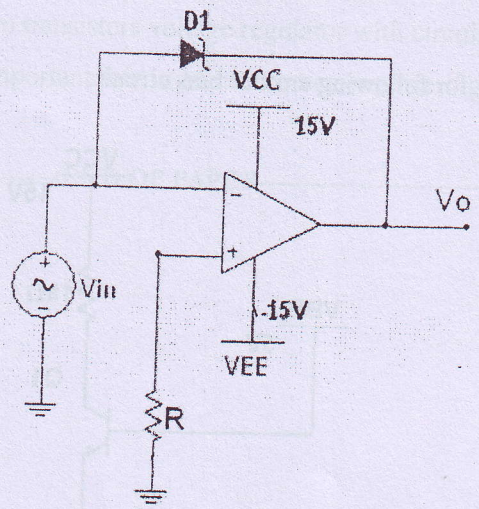
OR

Q.1

A. Explain crystal-controlled oscillators. (04)

B. Explain the 555 timer as pulse position modulator. (03)

C. In the circuit of following fig. Vin = 1 V pp 60Hz sine wave, R = 100Ω, Zener diode D1 of 5.1V and supply voltages = ± 15V. Determine the output voltage swing and draw the waveform. (03)



Q.2

A. Explain Exponential Amplifier using OPAMP. (04)

B. Determine the output voltage of an OPAMP for input voltages of V_{i1} = 150μV and V_{i2} = 140μV. The amplifier has a differential gain of A_d = 4000 and CMRR = 100. (03)

C. In the impedance matched system with 5 stages (connect in cascade) having a gain of each stage is A_{p1}=10, A_{p2}=20, A_{p3}=40, A_{p4}=80, A_{p5}=160. What is the decibel voltage gain of each stage? What is the total decibel power gain? (03)

OR

Q.2

A. Explain Integrator circuit using OPAMP. (04)

B. Deign and explain a circuit using OPAMP for $V_o = -25V_i$ where V_i is input voltage and V_o is output voltage. (04)

C. Draw the block diagram for Current Series feedback, voltage Shunt feedback configuration. (02)

Q.3 (10)

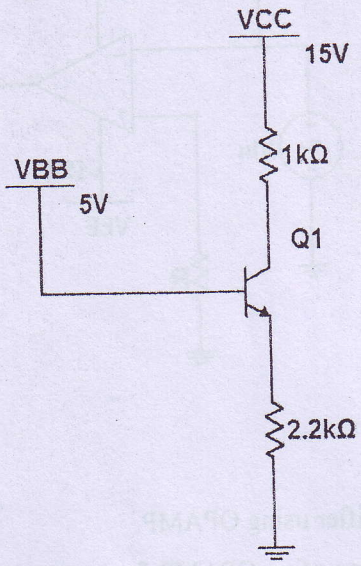
A. Deign a circuit with OPAMP for Vo = 5V1 + 2V2 + V3 where V1, V2 and V3 are input voltages and Vo is output voltage.

B. For the double ended input single ended output configuration differential amplifier circuit the parameter values are R_c= 47KΩ, R_E= 68KΩ, V_{CC}= +15V, V_{EE}= -15V, β=300 and input voltage V_{i1}= 10mv and V_{i2} = 3mv. Find out voltage gain, output voltage and input impedance.

SECTION: II

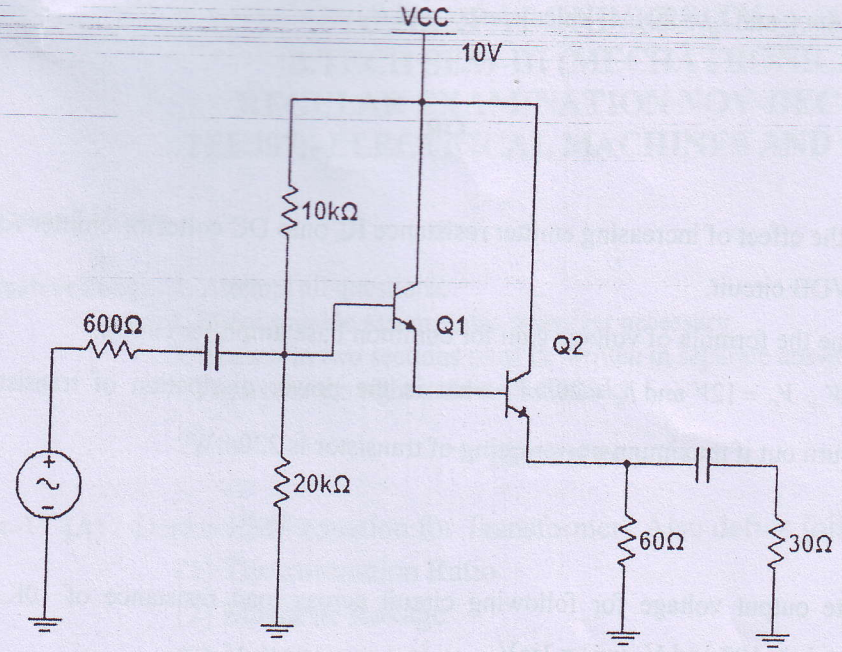
Q.4

A. Calculate Q point for following emitter bias circuit. (04)



Q.5

A. Calculate input impedance for following circuit if current gain is 100 for both transistors. (05)



B. Draw common collector amplifier circuit and explain its working principle. State why is it called emitter follower? Why is it more stable for low loading conditions? (05)

Q.6

A. Explain VDB ac amplifier circuit design procedure so that it has approximately infinite input impedance and very low output impedance. (04)

B. Explain zener follower and two transistors voltage regulator with circuit diagram. (04)

C. How does transistor play an important role in Mechatronics engineering? (02)

----------END OF PAPER----------

B. Draw DC and AC equivalent circuit for common base amplifier. (04)

C. If $I_E = 2.8mA$ and $I_B = 20\mu A$, calculate α_{dc} and β_{dc}. (02)

OR

Q.4

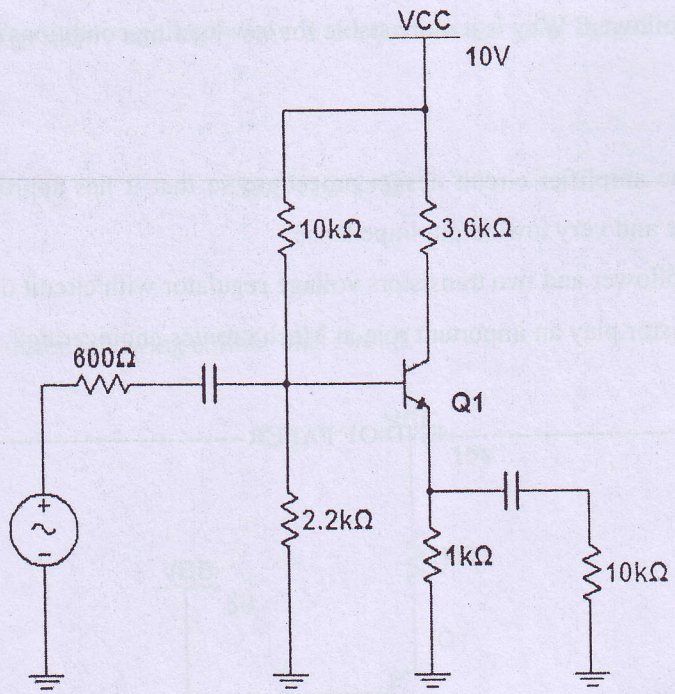
A. Explain the effect of increasing emitter resistance R_E onto DC collector-emitter voltage for emitter VDB circuit. (04)

B. Determine the formula of voltage gain for common base amplifier circuit. (04)

C. If $V_E = 2V$, $V_C = 12V$ and $I_E = 20mA$, what is the power dissipation of transistor? Will circuit burn out if maximum power rating of transistor is 220mW? (02)

Q.5

A. Calculate output voltage for following circuit across load resistance of 10K. Assume current gain = 100 and $V_{in}(pp) = 1mV$. (05)



B. Explain signal distortion and selection of ac emitter resistance for small signal operation. (05)

OR