PG/IS/ELC-104/15

M.Sc. 1st Semester Examination, 2015

ELECTRONICS

(*Analog Electronics*)

[Theory]

PAPER —ELC - 104

Full Marks : 50

Time : 2 hours

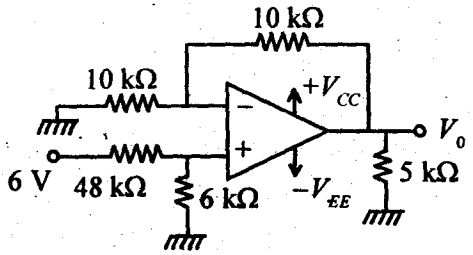
Answer **Q.No. 1** and any **three** questions from the rest

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

1. (*a*) For the circuit shown below.



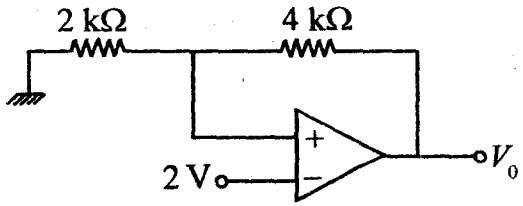
Find out the output voltage V_0.

(*b*) A dc voltage regulator power has a bad regulation 5 μr/mA. At no load, output voltage is 10 V. Calculate the output voltage at full load when the full load current is 100 mA.

(*c*) "A class-C amplifier could be used as a power amplifier"– Justify the statement.

(*d*) A tuned amplifier has maximum voltage gain at a frequency of 2 MHz and the bandwidth is 50 kHz. Find the Q factor.

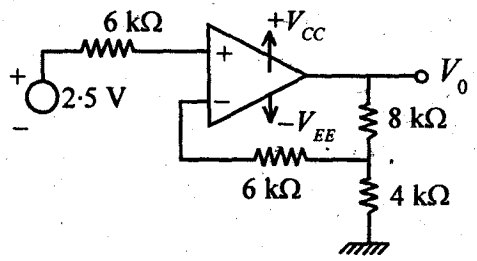
(*e*) Find V_0 of the given circuit-



2 × 5

2. (*a*) Draw the circuit diagram of a active low-pass second order Butterworth filter and explain its operation. Derive the expression of the transfer function.

(*b*) For the circuit shown below find out the value of V_0.



(*c*) Draw the equivalent electrical circuit of a piezoelectric crystal. 5 + 3 + 2

3. (*a*) Give the block diagram of a standard regulated power supply unit.

(*b*) Explain the principle of operation of a series voltage regulator using op-amp.

(*c*) Explain a Buck converter using suitable circuit diagram. 2 + 3 + 5

4. (*a*) Briefly explain the operation of a triangular wave generator with appropriate diagram. Also, derive the expression of o/p signal.

(*b*) Explain Schmitt trigger with suitable circuit diagram. Give input and output waveforms. (4 + 2) + (3 + 1)

5. (*a*) What do you mean by frequency shift keying ?

(*b*) Discuss how a PLL circuit can be used as a frequency multiplier.

(*c*) Indicate how phase detection could be achieved in PLL using XOR phase detector. 2 + 4 + 4

6. (*a*) Draw the circuit diagram of a single tuned amplifier and explain its operation.

(*b*) Name the basic component of a monochrome television receiver.

(*c*) In an integrator circuit the time constant is 2 sec. The input is 2 V. dc. Find the output voltage and sketch it. 5 + 2 + 3

[*Internal Assessment* : 10 Marks]