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.

![Circuit Diagram]

Find out the output voltage $V_0$.

(Turn Over)
(b) A dc voltage regulator power has a bad regulation 5 μA/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 $V_o$ of the given circuit-

```
2 kΩ ---- 4 kΩ
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
\| |  \| |
(b) For the circuit shown below find out the value of $V_o$.

(c) Draw the equivalent electrical circuit of a piezoelectric crystal.

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.

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]