

B.Sc.(Honours) Examination, 2019

Semester - VI

Physics (Honours)

Paper: BPE-7

(Electrical & Electronic Instruments)

Time: Three Hours

Full Marks: 40

Questions are of value as indicated in the margin.

Answer *any four* questions.

1. a) Draw a neat circuit diagram of a DC-DC step-down converter and explain its operation in a continuous mode. Derive the expression for such a converter and show that the output is always less than the input. 2+3+3
b) Draw a circuit diagram using an adjustable voltage regulator IC which gives 3.2V as output for the input 9V. 2
 2. Draw the circuit diagram of an astable multivibrator using 555 timer IC. Explain the operation with the help of internal architecture. Find the expression for the frequency of oscillation of the multivibrator. 3+4+3
 3. a) What is a voltage regulator? With the help of a block diagram explain the working principle of a shunt voltage regulator. 2+4
b) Draw the circuit diagram of a *current limiting circuit* and explain its operation. 4
 4. a) Draw the block diagram of a Cathode Ray Oscilloscope and explain the function of each block. 3+4
b) With the help of a circuit diagram explain the operation of a saw-tooth wave generator. 3
 5. a) What do you mean by “deflection sensitivity” and “deflection factor” of a Cathode Ray Tube? Derive an expression for deflection sensitivity using electrostatic deflection scheme. 3+4
b) Explain the function of *post-acceleration anode* in a Cathode Ray Tube. 3
 6. a) Draw the block diagram of a function generator and explain the operation describing each block. 3+3
b) Draw the circuit diagram of a diode shaping circuit and explain how a triangular signal can be converted into sinusoidal waveform. 2+2
 7. a) Draw the circuit diagram of a Schmitt trigger circuit and explain its operation. What do you mean by UTP and LTP in this context? 3+2
b) What is a digital multimeter? Explain briefly the working of a digital multimeter. 2+3
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