A-101

Total Pages : 4 **Roll No. ----------**

MPHY-508

Analog Electronics

M.Sc. Physics (MSCPHY)

2nd Semester, Examination 2024 (June)

Time: 2:00 hrs Max. Marks: 35

Note : This paper is of Thirty five (35) marks divided into Two (02) Section A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section-A (Long-Answer-Type Questions)

Note : Section 'A' contains Five (05) long-answer-type questions of Nine and Half (9.5) marks each. Learners are required to answer any Two (02) questions only.

[2x9.5=19]

P.T.O.

Q.1. What do you mean by biasing of a transistor? What is a self-bias or emitter bias? Draw the circuit diagram showing the self-bias of an N-P-N transistor in the CE configuration. Explain physically how the self-biasing resistor improves the stability. Explain the functions of the bypass and the coupling capacitors.

Q.2. What is criterion of oscillation in oscillator circuits? Explain principal and working of Tuned collector oscillator or phase shift oscillator.

Q.3. Explain with the help of a block diagram the working principle of a feedback amplifier. Find out an expression for the voltage gain with feedback.

Q.4. Draw the circuit diagram of an astable multivibrator and explain its principle of action, showing the collector voltage waveforms.

Q.5. Derive expressions for the voltage gain and the input resistance of an inverting amplifier using an OP AMP. Describe the use of an operational amplifier as an adder.

Section-B (Short-Answer-Type Questions)

Note : Section 'B' contains Eight (08) short-answer-type questions of Four (04) marks each. Learners are required to answer any Four (04) questions only.

[4x4=16]

Q.1. Distinguish between intrinsic and extrinsic semiconductors. Explain why intrinsic semiconductors are not very much practically useful.

Q.2. An n-p-n transistor with $\alpha = 0.98$ is operated in the CB configuration. If the emitter current is 3mA and the reverse saturation current is $I_{co} = 10\ \mu A$, what are the base current and the collector current?

Q.3. Define voltage regulation. Draw the circuit diagram of transistorized series regulated power supply and explain how voltage regulation is achieved.

Q.4. Give the circuit diagram of a Hartley oscillator and explain its operation.

Q.5. State the effects of negative feedback is an amplifier.

Q.6. Draw the circuit of a JFET bistable multivibrator and explain its working.

P.T.O.

Q.7. Explain open loop and closed loop gains of an OP-AMP.

Q.8. What type of feedback is used in an OP AMP adder? Justify your answer.

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