Roll No. : .....

Total No. of Questions : **11**] [Total No. of Printed Pages : **3**

BPF–2233

M.Sc. (Final) Examination, 2022

PHYSICS

Paper – VII (A)

(Electronics, Digital Electronics and Communication Electronics)

*Time : **3** Hours*] [*Maximum Marks : **75***

Section–A **(Marks : 2 × 10 = 20)**

Note :– Answer all *ten* questions (Answer limit **50** words). Each question carries **2** marks.

Section–B **(Marks : 5 × 5 = 25)**

Note :– Answer all *five* questions. Each question has internal choice (Answer limit **200** words). Each question carries **5** marks.

Section–C **(Marks : 10 × 3 = 30)**

Note :– Answer any *three* questions out of five (Answer limit **500** words). Each question carries **10** marks.

Section–A

1. (i) Define CMRR.

   (ii) Write advantages of negative feedback in OP-AMP.

(iii) What do you mean by Virtual Ground ?

(iv) The output of a particular OP-AMP increase 8 V in 12μs. Find slew rate.

(v) Why is amplifier circuit necessary for an oscillator ?

(vi) Write the *two* differences between Klystron and Travelling wave tube.

(vii) What are the advantages of Microwave transmission ?

(viii) What is Fresnel zone problem ?

(ix) Define Geostationary Satellite.

(x) Write Radar range equation.

Section–B

2. Discuss the d.c. analysis of a differential amplifier.

Or

Discuss the circuit diagram and working of voltage follower.

3. Discuss the operation of OP-AMP differentiator.

Or

Explain (i) Output offset voltage and (ii) Input offset current in OP-AMP.

4. Draw a circuit diagram of phase shift oscillator using operational amplifier. Explain its working. Prove that frequency of oscillation (f_0) of phase shift oscillator is given by :

$$f_0 = \frac{1}{2\pi\sqrt{6}\,RC}$$

Or

What is Density Modulation ? How is it achieved in two cavity Klystron ?

5. Write constructions and working of IMPATT diode.

Or

Discuss atmospheric effect and loss in free space for microwave propagation.

6. Explain the mechanism of signal detection using Radar. Give proper block diagram.

Or

Explain briefly :

(i) Link modules

(ii) Lock angle

Section–C

7. (a) Explain inverting and non-inverting modes of operational amplifier. Obtain the expression of gain in each case.

   (b) How does negative feedback affect the output impedance and bandwidth of operational amplifier ? Discuss.

8. What are Voltage Regulator ? Explain fixed, adjustable and switching voltage regulator in detail.

9. Discuss the construction and working of a 'Magnetron'.

10. What is Gunn effect ? Draw the V-I characteristics of Gunn diode. How is it used as an oscillator in microwave ?

11. Explain the following :

    (i) Receiver noise

    (ii) Antenna parameter

    (iii) Signal to noise ratio

    (iv) Radar transmitters