M.Sc. 3rd Semester Examination, 2021
PHYSICS
Course Title : Advanced Electronics-II
Course Code : 304MEA
Course ID : 32454

Time: 2 Hour **Full Marks: 40**

The figures in the right hand side margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable

1. Answer *any five* of the following: 2×5=10

   (a) What is Darlington pair?

   (b) Describe Epitaxial growth in IC technology.

   (c) What is the necessity of feedback in op-amp?

   (d) Write a program to subtract two numbers in assembly language.

   (e) What is the duty of an ENABLE in a multiplexer?

   (f) What is propagation delay? Explain with proper diagram.

   (g) What is Fan-In and Fan-Out of a digital gate?

   (h) Define the following in the context of gate:

      i. $V_{IH(min)}$,

      ii. $V_{IL(max)}$.

2. Answer *any four* of the following: 5×4=20

   (a) What are the steps of monolithic IC technology? Describe Oxidation.

   (b) Describe acquisition range and tracking range of a Phase Locked Loop (PLL).

   (c) Discuss the operation of an op-amp based square wave generator with suitable diagram.

   (d) What is a multiplexer? Discuss with proper diagram and truth table a quadrupole two-input multiplexer. 1+4=5

   (e) What do you mean by analog comparators? Discuss its operation. 2+3=5

   (f) Discuss the circuit operation of a Widler current source.

3. Answer *any one* of the following: 10×1=10

   (a) (i) Derive the intrinsic gain of a common-source (CS) amplifier with current-source load.

     (ii) Find the output resistance of a source-degenerate CS amplifier.

     (iii) Obtain the gain of a current-mirror circuit. 3+3+4=10

   (b) Describe the operation of an inverting precision full-wave rectifier with proper figures.

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