



## GOVERNMENT COLLEGE OF ENGINEERING, JALGAON

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Name of Examination : **Summer 2021** - (Preview)

Course Code & Course Name : **SH152U - Engineering Physics**

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Maximum Marks : **60**

Duration : **3 Hrs**

[Edit](#) [Print](#) [View Answer Key](#) [Close](#) **Answer Key Submission Type:** Marking scheme with model answers and solutions of numerical

Instructions:

1. All questions are compulsory. Do not write anything on the question paper.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

### 1) Solve any three.

- a) State piezoelectric effect. Draw a diagram of the piezoelectric generator and explain its working. [5]
- b) Describe and explain the formation of Newton's rings in reflected monochromatic light. [5]
- c) Find the lowest energy level and momentum of an electron in one dimensional potential well of width 1AU. [5]
- d) A lecture hall of 15 x 12 x 5 m dimension has an average absorption coefficient of 0.1. Calculate reverberation time. If 12.6  $\mu$ W sources are used in the hall, calculate ultimate intensity in the hall. [5]

### 2) Solve any three.

- a) What is meant by the diffraction of light? State the types of diffraction and distinguish between them. [5]
- b) What is the Hall effect? Derive an expression for Hall voltage. [5]
- c) If 2 amp current is passed through a coil having 150 turns on iron with length 20 cm and cross-sectional area 2 cm<sup>2</sup> with relative permeability 250 find mmf, H, B, flux and reluctance. [5]
- d) Hydrogen has a red emission line at 656.3 nm, what is the energy and frequency of a photon of this light? Note: Planck's constant = 6.626 x 10<sup>-34</sup> J-s, speed of light = 2.998 x 10<sup>8</sup> m/s [5]

### 3) Solve any three.

- a) State Schrodinger wave equation? Obtain an expression for the Schrodinger time-dependent wave equation. [5]
- b) Describe the construction and working of the He-Ne laser with an energy level diagram. [5]
- c) The RI of glass and water are 1.54 and 1.33. Which will be greater the polarizing angle for a beam incident from water to the glass or that for a beam incident from glass to water? [5]
- d) A uniform silver wire has a resistivity of 1.54x10<sup>-8</sup> m at room temperature. For an electric field along the wire of 1-volt cm<sup>-1</sup>, compute the average drift velocity of electron assuming that there is 5.8 x 10<sup>28</sup> conduction electrons /m<sup>3</sup>. Also, calculate the mobility. [5]

### 4) Solve any five.

- a) State magnetic properties of nanomaterials. [3]
- b) Distinguish between hard and soft magnetic materials. [3]
- c) State the applications of laser in science and technology. [3]
- d) Explain the term anti-reflection coating. [3]
- e) A grating containing 4000 slits per centimeter is illuminated with monochromatic light and produces the second-order bright line at a 30° angle. What is the wavelength of the light used? (1 Å = 10<sup>-10</sup> m) [3]
- f) The sound level from a single violin playing is 60 dB. Find its intensity from the definition of level in terms of intensity [3]

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