



# GOVERNMENT COLLEGE OF ENGINEERING, JALGAON

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Name of Examination : **FY Winter 2021** - (Preview)

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

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Maximum Marks : **60**

Duration : **3 Hrs**

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**Answer Key Submission Type:** Marking scheme with model answers and solutions of numerical

## Instructions:

1. All questions are compulsory.
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) Attempt any Three from the following questions [4]
  - a) Explain, energy level diagram of Nd:YAG laser [4]
  - b) Give list factors affecting architectural acoustics. Discuss formula for reverberation time.
  - c) Give difference between Soft magnetic materials and hard magnetic materials [4]
  - d) De-Broglie wavelength of a particle moving with 20% of velocity of light and proton moving with 40% of velocity of light are equal. Calculate the wavelength and mass of the particle [4]
- 2) Attempt any Three from the following questions
  - a) Compare Type-I and Type-II superconductor [4]
  - b) Explain Superconductors are nothing but perfect diamagnetic materials [4]
  - c) Calculate the distance between the two successive positions of a movable mirror of Michelson's interferometer giving best fringes in case of sodium having lines of wavelength  $5896 \text{ \AA}$  and  $5890 \text{ \AA}$ . [4]
  - d) Give list of properties of laser. Explain importance of stimulated emission in case of laser production. [4]
- 3) Attempt any Three from the following questions
  - a) What is polarization? Explain principle Nicol prism with figure [4]
  - b) What is ultrasonic wave? Draw diagram of Magnetostriction. Explain The role of e.m.f to produce mechanical vibrations. [4]
  - c) Explain phenomenon of TIR in Fiber optics. Explain conditions of total internal reflection [4]
  - d) What are different methods of nano-fabrications? Explain bottom up approach and top down approach by figure only. [4]
- 4) Attempt any Four from the following questions
  - a) A slit of width  $2 \times 10^{-3} \text{ mm}$  is illuminated by parallel beam of light of wavelength  $5890 \text{ \AA}$ . Find the position of first two minima in the diffraction pattern. [6]
  - b) Explain Hall effect for finding concentration of charge carrier [6]
  - c) What is Fermi energy? Give Fermi energy presentation in figures for intrinsic and extrinsic semiconductors [6]
  - d) The volume of a hall is  $3398.4 \text{ m}^3$  and its total absorption equals  $92.8 \text{ m}^2$  of an open window. Entry of people inside the hall raises the absorption by  $185.50 \text{ m}^2$ . Determine the change in reverberation time [6]
  - e) Give the list of properties of Ultrasonic waves. A pulse of frequency  $90 \text{ kHz}$  is sent down towards the sea level. The echo is recorded after  $0.9 \text{ sec}$ . If the velocity of ultrasonic sound in sea water is  $1600 \text{ m/s}$ , determine the depth of sea and wavelength of the ultrasonic pulse [6]

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