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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 \AA and 5890 \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 \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 m^3 and its total absorption equals 92.8 m^2 of an open window. Entry of people inside the hall raises the absorption by 185.50 m^2 . Determine the change in reverberation time [6]
 - e) Give the list of properties of Ultrasonic waves. A pulse of frequency 90 kHz is sent down towards the sea level. The echo is recorded after 0.9 sec . If the velocity of ultrasonic sound in sea water is 1600 m/s , determine the depth of sea and wavelength of the ultrasonic pulse [6]

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