



**Sanjay Ghodawat University, Kolhapur**  
Established as State Private University under Govt. Of Maharashtra. Act No  
XL, 2017

2018-19  
EXM/P/09/01

Year and Program 2018-19

Course Code: FYT 102

Day and Date: Friday  
24<sup>th</sup> May, 2019

School of Technology  
Course Title: Applied Physics

End Semester Examination

F.Y.B.Tech  
Semester – II

Time:

Max Marks: 100

10:30 am to 1:30 pm

- Instructions:**
- 1) All questions are compulsory.
  - 2) Assume suitable data whenever necessary.
  - 3) Use of non-programmable calculator is allowed.

Q.1	Attempt the Following	Marks	Blooms level	CO
a)	What is Magnetostriction effect? With necessary circuit diagram, explain production of ultrasonic waves using ferromagnetic rod.	07	L2	CO1
<b>OR</b>				
a)	What is acoustic grating? Explain how acoustic grating is used to determine the wavelength of ultrasonic waves.	07	L2	CO1
b)	i) Explain Laurentz half shade polarimeter with neat diagram. ii) Determine the strength of sugar solution when a tube of sugar solution 20 cm long is placed between crossed Nicols & illuminated with light of wavelength $6 \times 10^{-5}$ cm. If the optical rotation produced is $13^\circ$ & the specific rotation is $65^\circ$ .	08	L4	CO2
<b>OR</b>				
b)	i) Derive condition for maxima using plane diffraction grating. ii) A plane diffraction grating has the value of grating constant equal to $15 \times 10^{-4}$ cm. Calculate the angle of diffraction at which third order maxima is observed for the wavelength $2.4 \times 10^{-4}$ cm.	08	L4	CO2
Q.2	Attempt the Following			
a)	Discuss the following quantum processes i) Stimulated absorption ii) Spontaneous emission iii) Stimulated emission iv) Population inversion	07	L2	CO3

OR

**ESE**

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ii) Explain the following

1) Magnetization 2) Magnetic susceptibility

**Q5 Solve any TWO**

- |  |    |    |     |
|--|----|----|-----|
| a) Define atomic packing fraction. Calculate atomic packing fraction of SC, BCC & FCC lattice. | 09 | L3 | CO6 |
| b) Define atomic radius. Evaluate atomic radius for SC, BCC, and FCC lattice.                  | 09 | L3 | CO6 |
| c) Describe twenty three symmetry elements of cubic lattice.                                   | 09 | L3 | CO6 |

**Q6 Solve any Three**

- |   |    |    |     |
|---|----|----|-----|
| a) What the origin of magnetic properties of magnetic materials.              | 06 | L1 | CO5 |
| b) State six applications of magnetic materials                               | 06 | L1 | CO5 |
| c) Define miller indices. Sketch the following planes (100),(010),(001),(110) | 06 | L1 | CO6 |
| d) Explain Bragg's X-ray spectrometer with neat diagram.                      | 06 | L1 | CO6 |

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**ESE**

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|--|----|----|-----|
| a) State characteristics of LASER and thus explain applications of LASER | 07 | L2 | CO3 |
| b) Derive Schrodinger's time independent wave equation of a particle     | 08 | L3 | CO4 |

**OR**

- |  |    |    |     |
|--|----|----|-----|
| b) Explain Heisenberg's uncertainty principle. Calculate uncertainty in the measurement of momentum of an electron and kinetic energy needed by an electron to be confined in the atom if uncertainty in position is $1\text{\AA}$ . | 08 | L3 | CO4 |
|--|----|----|-----|

**Q.3 Solve any TWO**

- |   |    |    |     |
|---|----|----|-----|
| a) Attempt the following  | 08 | L2 | CO1 |
| 1) Obtain Sabine's formula for reverberation time                           |    |    |     |
| 2) State applications of ultrasonic waves.                                  |    |    |     |
| b) Explain the following  | 08 | L2 | CO2 |
| 1) Applications of electromagnetic waves                                    |    |    |     |
| 2) O-ray and e-Ray  |    |    |     |
| c) Explain the following  | 08 | L2 | CO3 |
| 1) Basic principle of optical fibre   |    |    |     |
| 2) Acceptance angle, Numerical aperture, Fractional refractive index change |    |    |     |
| d) Explain the following  | 08 | L2 | CO4 |
| 1) de-Broglie's hypothesis of matter wave                                   |    |    |     |
| 2) Compton effect with neat diagram   |    |    |     |

**Q4 Solve any TWO**

- |   |    |    |     |
|---|----|----|-----|
| a) What is a diamagnetic substance? Explain the characteristics of the diamagnetic substance. | 09 | L2 | CO5 |
| b) Explain ferromagnetic domain theory and state properties of ferromagnetic substances.      | 09 | L2 | CO5 |
| c) i) Describe the Hysteresis loop  | 09 | L2 | CO5 |

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