Sanjay Ghodawat University, Kolhapur

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2020-21

EXM/P/09/00

Year and Program: 2020-21 B.Sc.	**School of Science**	**Department: Physics**
Course Code: PHS202	**Course Title: Physics-IV (Waves & Optics)**	**Semester: IV**
Day and Date:	**End Semester Examination**	**Time:2 Hrs. Max Marks:50**

Instructions: 1) All Questions are compulsory.
2) Use of non-programmable calculator is allowed.

Q.1		**Attempt the following questions.**	**Marks**	Bloom's Level	CO
	a)	i) Derive relation between group velocity and phase velocity. ii) Two travelling waves y1=0.65sin (0.4x-800t) m and y2=-0.65sin (0.4x-800t) m are superimposed in a medium. Calculate the maximum displacement at point x=2.5π meter.	4 4	L3 L3	CO1
	b)	i) Explain the advantages of piezoelectric and magnetostriction oscillator. ii) Determine the fundamental frequency of travelling wave on a string. **OR**	4 4	L2 L2	CO2 CO1
	b)	i) The oscillatory circuit in a piezoelectric oscillator consists of an inductance of 2 Henry. Determine the capacitance needed to generate ultrasonic waves of 10^5 Hz frequency. ii)Explain the use of acoustic grating for the calculation of velocity and frequency of ultrasonic waves.	3 5	L2 L2	CO2
Q.2		**Attempt the following questions.**			
	a)	i) Obtain the condition for maxima and minima due to diffraction at a single slit. ii) Differentiate between single slit and double slit diffraction pattern.	6 2	L3	CO3
	b)	i) State the Fresnel's assumptions to find resultant effect at screen due to wavefront. ii) Obtain the expression for the average distance of nth half period zone hence show that path difference between two half period zones is $\frac{\lambda}{2}$. **OR**	2 6	L2	CO3

	b)	i) Find the radii of first three transparent zones of a zone plate whose first focal length is 1m for λ=5893A°. ii) The diameter of first ring of a zone plate is 1.1mm. If plane waves of λ=6000A° fall on the plate, where should the screen be placed so that the light is focused to a bright spot.	4 4	L2 L2	CO3 CO3
Q.3		**Attempt the following questions.**			
	a)	i) State the conditions for interference pattern. ii) Describe the types of interference.	5 4	L1 L1	CO4
	b)	What is Fresnel biprism? Explain experimental arrangement of Fresnel biprism with neat ray diagram. **OR**	9	L1	CO4
	b)	Obtain the condition for maxima and minima due to interference in thin film.	9	L1	CO4