

UG-346

BPHY-12

**B.Sc. DEGREE EXAMINATION —
DECEMBER, 2019.**

First Year

OPTICS AND SPECTROSCOPY

Time : 3 hours

Maximum marks : 75

PART A — (5 × 3 = 15 marks)

Answer ALL questions.

1. Explain the methods of minimizing spherical Aberration.
2. Write a note on fresnel's biprism.
3. Discuss the phenomenon of Fraunhofer diffraction.
4. Explain the construction, principle of half wave plate.
5. What is Rayleigh scattering? How is the blue of the sky explained.

PART B — (5 × 12 = 60 marks)

Answer ALL questions.

6. (a) Explain Deviation without dispersion and dispersion without deviation.

Or

- (b) Discuss the importance of an eyepiece in an optical instrument. Describe with theory the construction of Huygen eyepieces.

7. (a) Explain how you can determine the diameter of a thin wire accurately using air wedge method.

Or

- (b) Determine the wavelength of monochromatic light using a Fresnel's biprism.

8. (a) Describe Fraunhofer diffraction at single slit with neat diagram.

Or

- (b) Give the relation between magnifying power and resolving power of a telescope.

9. (a) Explain the theory of production and detection of circularly polarized light.

Or

- (b) Describe the construction and working of Laurent's half shade polarimeter.

10. (a) Explain how IR,UV are produced and detected. Give the uses of the same.

Or

- (b) Explain the quantum theory of Raman effect and also write how its different from fluorescence spectra.
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BPHY-11

**B.Sc. DEGREE EXAMINATION —
DECEMBER, 2019.**

First Year

Physics

**MECHANICS, PROPERTIES OF MATTER AND
SOUND PHYSICS**

Time : 3 hours

Maximum marks : 75

PART A — (5 × 3 = 15 marks)

Answer ALL questions.

1. Write about elastic and inelastic collisions.
2. Derive the law of gravitation.
3. Derive the relation between the elastic constants.
4. Find the rate of flow of liquid.
5. Explain SHM and find the time period.

PART B — (5 × 12 = 60 marks)

Answer ALL questions.

6. (a) Explain the impact of two smooth spheres.
Or
(b) Explain the impact of smooth sphere on a fixed smooth plane.

7. (a) Explain the potential due to a spherical shell.

Or

(b) Explain the Boy's method to find G.

8. (a) Discuss the uniform bending method.

Or

(b) Explain the determination of Poisson's ratio.

9. (a) Explain the Poiseulli's method to find viscosity of the liquid.

Or

(b) Explain the excess pressure inside a liquid drop and inside a soap bubble.

10. (a) Explain the Melde's string experiment.

Or

(b) Explain the composition of two SHM.

UG-330

**BMS-13/
BPHY-01**

**B.Sc. DEGREE EXAMINATION —
DECEMBER, 2019.**

First Year

Mathematics

DIFFERENTIAL EQUATIONS

Time : 3 hours

Maximum marks : 75

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1. Solve : $xyp^2 + (x + y)p + 1 = 0$
2. Solve : $(D^2 + 4)y = x^2$.
3. Test for exactness and hence solve $(x^2 - 2xy + 3y^2)dx + (y^2 + 6xy - x^2)dy = 0$.
4. Solve the following PDE by Charpit's method $p^2 - xp - q = 0$.

5. Evaluate : $L[te^{2t} \cos 2t]$.
6. Solve : $xp^2 - yp - x = 0$.
7. Solve : $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = e^x \cos x$.
8. Evaluate $L^{-1}\left[\frac{7s-1}{(s+1)(s+2)(s+3)}\right]$.

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Solve : $p^2 + 2yp \cot x - y^2 = 0$.
10. Solve by variation of parameter method
 $\frac{d^2y}{dx^2} + 4y = \tan 2x$.
11. Solve : $(mz - ny)dx + (nx - lz)dy + (lx - my)dz = 0$.
12. Find complete and singular solution of
 $z = px + qy + p^2q^2$.
13. Using Laplace transform solve
 $\frac{d^2y}{dt^2} + \frac{6dy}{dt} + 5y = e^{-2t}$.

14. Solve : $x^2 \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} - 4y = x^2 + 2 \log x$.

15. Solve : $(y - z)p + (z - x)q = x - y$.

16. Find :

(a) $L^{-1} \left[\log \left(\frac{s^2 + 9}{s^2 + 1} \right) \right]$

(b) $L \left[\frac{\cos 3t - \cos 2t}{t} \right]$.
