



UNIVERSITY OF THE PUNJAB

First Semester – 2019

Examination: B.S. 4 Years Program

Roll No.

PAPER: Physics-I (Mechanics & Optics)

Course Code: PHY-111 Part – II

MAX. TIME: 2 Hrs. 45 Min.

MAX. MARKS: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2 Write short answers to the following questions (10x2)

1. What do you understand by the curl of a vector function?
2. If $\varphi = 3x^2\hat{i} + 2sy^4\hat{j} + xz^3\hat{k}$. Find Curl of φ .
3. Does the value of gravitational acceleration 'g' remain same at the equator and pole of the earth? Justify your answer.
4. How the swing is produced in a moving cricket ball?
5. At what angle of projection the range and height of a projectile becomes equal?
6. How does the viscosity of liquids and gases vary with temperature?
7. Calculate the gravitational force between two bodies each of mass 1 kg and separated by a unit distance.
8. What are uses of diffraction grating?
9. How the fringe spacing in the interference pattern will be affected if you perform Young's double slit experiment under water?
10. How diffraction differs from interference? Give any two points.

(Essay-type questions)

- Q. 3 (a) Define divergence of a vector field. State and prove the Gauss's divergence theorem. (6)
- (b) A block is at rest on an inclined plane making an angle θ with horizontal. The block start sliding down as the angle of inclination becomes greater than 15° . What is the coefficient of static friction between the block and inclined plane? (4)
- Q. 4 (a) State parallel axis theorem. Using parallel axis theorem, find the rotational inertia of a solid cylinder about an axis passing through its center and perpendicular to its axis of symmetry. (6)
- (b) State and prove the equation of continuity. (4)
- Q. 5 (a) What is Michelson Interferometer? What is its least count? Explain its working. (6)
- (b) A slit of width 'a' is illuminated by white light. For what value of 'a' you would observe the first minima for red light having wavelength $\lambda = 650 \text{ nm}$ fall at $\theta = 15^\circ$? (4)