

PUNJAB PUBLIC SERVICE COMMISSION
COMBINED COMPETITIVE EXAMINATION FOR
RECRUITMENT TO THE POSTS OF
PROVINCIAL MANAGEMENT SERVICE-2019

SUBJECT: PHYSICS (PAPER-I)

TIME ALLOWED: THREE HOURS

MAXIMUM MARKS: 100

NOTE: Attempt Five Questions in All. Attempt in Urdu or English.

Q No. 1: (a) Prove that a positively charged particle projected at right angles to a uniform magnetic field \mathbf{B} , describes a circle. **(10 Marks)**

(b) Discuss motion of satellites and derive mathematical expressions for speed and time period. **(10 Marks)**

Q No. 2: How does the Michelson Morley experiment prove that the velocity of light is the same when measured along two perpendicular directions in a frame of reference which is supposed to be moving relative to the ether? **(20 Marks)**

Q No. 3: (a) Describe travelling waves and discuss sinusoidal waves also. **(10 Marks)**

(b) What are the stationary waves? Analyze standing waves mathematically. **(10 Marks)**

Q No. 4: (a) Derive electromagnetic wave equation. **(10 Marks)**

(b) Explain grating spectrometer and its resolution. **(10 Marks)**

Q No. 5: (a) How can you produce and measure low temperatures? Explain in detail. **(10 Marks)**

(b) Describe in detail third law of thermodynamics. **(10 Marks)**

Q No. 6: State and derive Gauss's and Stoke's theorems. **(20 Marks)**

Q No. 7: (a) State and explain Law of Conservation of Linear Momentum. **(10 Marks)**

(b) Explain gyroscope and its precession. **(10 Marks)**

Q No. 8: Write short note on the following: **(4x5=20 Marks)**

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| (i) Kepler's laws of planetary motion | (ii) Surface tension |
| (iii) Newton's Rings | (iv) Fermi-Dirac statistics |