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UG/1st Sem/PHS(H)/Pr/19

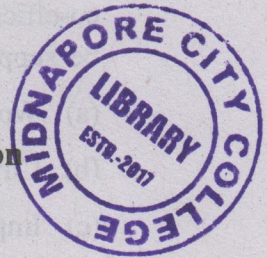
2019

B.Sc.

1st Semester Examination

PHYSICS (Honours)

Paper—GE 1-P



Full Marks : 20

Time : 3 Hours

*The figures in the margin indicate full marks.  
Candidates are required to give their answers  
in their own words as far as practicable.*

**Elements of Modern Physics Lab**

1. Determine the value of Boltzmann constant using V-I characteristics of p-n diode [value of n is to be supplied]
  - (a) Working formula. 2
  - (b) Circuit diagram. 2
  - (c) Implementation of the circuit. 2
  - (d) Data for  $\ln I$  Vs.  $V$  curve. 5
  - (e) Drawing  $\ln I$  Vs.  $V$  curve. 2
  - (f) Calculation of  $k$  from graph. 2
2. Determine work function of the material filament of directly heated vacuum diode. [Temperature

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( 2 )

co-efficient of resistance of filament material is to be supplied]

- (a) Working formula. 2
- (b) Circuit diagram. 2
- (c) Implementation of the circuit. 2
- (d) Data for  $\ln \frac{1}{T^2}$  Vs.  $\frac{1}{T}$  graph. 5
- (e) Drawing  $\ln \frac{1}{T^2}$  Vs.  $\frac{1}{T}$  graph. 2
- (f) Calculation of work function from graph. 2
3. Determine the wave length of  $H_{\alpha}$  emission line of Hydrogen atom using grating method. [Number of rulings per mm is to be supplied]
- (a) Working formula. 2
- (b) Vernier constant of the spectrometer. 1
- (c) Setting the grating for normal incidence. 2
- (d) Reading for deviation of  $H_{\alpha}$  line for any order on either side of the central maximum. (Reading for both vernier are to be taken) 8
- (e) Calculation of the wavelength of  $H_{\alpha}$  emission line. 2
4. Determine the wave lengths of absorption lines in the rotational spectrum of Iodine vapour.
- (a) Working formula. 2

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- (b) Vernier constant of the spectrometer. 1
- (c) Setting the grating for normal incidence. 2
- (d) Reading for deviation of  $H_{\alpha}$  line for any two absorption lines specified by the examiner. (Readings on Either side of the central maximum and for one vernier is to be taken) 8
- (e) Calculation of the wavelength of  $H_{\alpha}$  emission line. 2
5. Study the diffraction patterns of a single slit using laser and measure its intensity variation using LDR.
- (a) Theory 2
- (b) Data of LDR current versus angle of diffraction (only main scale reading with one vernier) on each sides of the central maximum. 8
- (c) Drawing intensity (in arbitrary unit) versus angle of diffraction graph. 3
- (d) Calculation of slit width from position of 1st order minima. 2
6. Determine of Planck's constant by photo electric effect.
- (a) Working formula. 2
- (b) Figure with circuit diagram. 3
- (c) Data for stopping potential of photo diode for lights of five wavelengths. 5

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- (d) Drawing stopping potential versus wavelength graph. 3
- (e) Calculation of Planck's constant from graph. 2
- 7. Determine the value of  $\frac{e}{m}$  by magnetic focusing (Thomson's method)
  - (a) Working formula.
  - (b) Calculation of magnetic field of the Helmholtz coil from magnetizing current. [Radius and number of turns of the Helmholtz coil are to be supplied] 2
  - (c) Data for  $D^2$  versus  $V$  graph (for at least four accelerating voltages) 7
  - (d) Drawing  $D^2$  versus  $V$  graph. 2
  - (e) Calculation of  $\frac{e}{m}$ . 2

Experiment 15 marks

Laboratory Note book 02 marks

Viva voce 03 marks

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