



**UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA**  
**SECOND SEMESTER EXAMINATIONS, MAY 2018**

**COURSE NO:** GM 172  
**COURSE NAME:** APPLIED OPTICS  
**CLASS:** GM I **TIME:** 3 HOURS

Name: \_\_\_\_\_ Index Number: \_\_\_\_\_

**ANSWER THREE QUESTIONS**

*A total mark of 60 is to be awarded*

**Q.1**

- (a) Describe the optical system of the astronomical telescope and its related functions. [7 marks]
  - (b) Briefly explain chromatic aberration, spherical aberration and diffusion in lenses. [3 marks]
  - (c) Explain why many optical devices require two lenses. [2 marks]
  - (d) State the difference between a still image and moving image. [2 marks]
  - (e) Sketch and name the Types of Lenses. [3 marks]
  - (f) What is an image? [1 mark]
  - (g) State the difference between converging and diverging lenses. [2 marks]
- [20 marks]**

**Q.2**

- (a) State the two classifications of the EDM instrument. [2 marks]
  - (b) Describe the methods of measurement by the EDM instrument. [8 marks]
  - (c) State five properties of the electromagnetic waves. [5 marks]
  - (d) Explain in detail the infrared waves and radio waves. [5 marks]
- [20 marks]**

**Q.3**

- (a) Explain in detail the following types of spectra [3 marks each].
  - (i) Continuous spectra
  - (ii) Discrete Spectra
  - (iii) Emissions Spectra
  - (iv) Absorption Spectra
- (b) With the aid of a diagram, discuss the concept of spectroscopy. [8 marks]

**[20 marks]**

#### **Q.4**

(a) A 4.0 cm tall light bulb is placed a distance of 8.3 cm from a convex mirror having a focal length of 15.2 cm.

(i) Determine the image distance and the image size. [5 marks]

(ii) Provide interpretation of the results obtained in (i). [2 marks]

(b) State two differences between the total station and the electronic distance measuring instrument.

[2 marks]

(c) Sketch and clearly label the internal focusing surveying telescope. [6 marks]

(d) Use diagrams to illustrate the effects of converging and diverging lenses on parallel rays. [5 marks]

**[20 marks]**

*Course Examiners: Dr Y. Y. Ziggah/ Dr I. Yakubu*