**

**NATIONAL OPEN UNIVERSITY OF NIGERIA**

 **FACULTY OF SCIENCES**

**DEPARTMENT OF ENVIRONMENTAL SCIENCES**

**Plot 91, Cadastral Zone, Nnamdi Azikwe Expressway, Jabi, Abuja**

**JULY 2018 EXAMINATIONS**

**COURSE CODE:** ESM 392 **TIME ALLOWED:** 2 Hours

**COURSE TITLE:** REMOTE SENSING 2 Credit Units

**Instruction:** Attempt question number ONE (1) and any other THREE (3) questions. Question number one (1) is compulsory and carries 25 marks, while the other questions carry equal marks (15) each

**1a.** Distinguish energy interaction in the atmosphere and with earth surface features**. 8marks**

**b.** Energy interaction with earth surface features gives rise to the energy balance equation**. 8marks**

**1c**. Distinguish the types of aerial photographs and state the various uses of each**. 9marks**

**2a.** Define the following terms used in photogrammetry

Principal point

Flight line

Over lap

Stereo pair **6marks**

b. Examine the 2 ways of obtaining the scale of an aerial photograph **=** **4marks**

**c**. Compute the scale of an aerial photograph taken with an aerial camera of focal length 152mm and from a flying height of 830m above sea level, over an area of average height of 50m above sea level. **5marks**

**3a.** Discuss the various characteristics of photographic images**. 5marks**

**b.** Identify 2 ways of mapping from aerial photographs**. 5marks**

**c.** How do we achieve the following on a pair of overlapping aerial photographs**? 5marks**

4a. Each type of remote sensor reacts to energy bands of specific frequency and wavelength. Discuss this statement, highlighting the designated sensors and their capabilities within a certain range of the electromagnetic energy. **8marks**

b. 8 of the current sensors that are on board space borne platforms are? **4marks**

c. List the forms in which remote sensing platforms can be classified**. 3marks**

**5a.** What is image rectification and restoration. **5marks**

**b.** Explain briefly the processes of carrying out digital image restoration and justify the rationale for doing it in remote sensing. **5marks**

List the various techniques of pre-processing digital images. **5marks**