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**SARDAR PATEL UNIVERSITY**  
**S.Y.B.Sc. Examination, FOURTH Semester**  
**Wednesday, 11<sup>th</sup> April 2018**  
**Time : 10.00 am To 12.00 noon**  
**Physics Course Code : US04EPHY02**

**Course Title : Advanced Geophysics and Remote Sensing**

**Total Marks : 70**

**Q-1 Write answers to the following multiple choice questions in your answer book by [10] selecting the proper option.**

- (1) A plot of the gravitational acceleration versus location is known as gravity \_\_\_\_\_.  
 (a) profile (b) curve (c) plot (d) trace
- (2) The instrument used to measure gravity is called \_\_\_\_\_.  
 (a) gravometer (b) gravimeter (c) gravinometer (d) graviter
- (3) According to Newton's law of gravitation the force of gravitation is given by  
 (a)  $F=G/m_1m_2r^2$  (b)  $F=Gm_1/m_2r^2$  (c)  $F=Gm_1m_2/r^2$  (d)  $F=1/Gm_1m_2r^2$
- (4) The velocity of p-waves is always \_\_\_\_\_ that of s-waves.  
 (a) greater or equal to (b) less or equal to (c) less than (d) greater than
- (5) The minimum number of boreholes required in cross-hole survey is \_\_\_\_\_.  
 (a) 1 (b) 2 (c) 3 (d) 4
- (6) The visible range of electromagnetic spectrum falls between \_\_\_\_ and \_\_\_\_  $\mu\text{m}$ .  
 (a) 0.4 & 0.7 (b) 0.5 & 0.7 (c) 0.6 & 0.7 (d) 0.3 & 0.7
- (7) The ability of the sensor to discriminate the smallest object on the ground of different sizes is called \_\_\_\_\_ resolution.  
 (a) spatial (b) spectral (c) radiometric (d) temporal
- (8) The number of wave crests passing through a fixed point in one second is called \_\_\_\_\_.  
 (a) wavefront (b) wavelength (c) amplitude (d) frequency
- (9) The total solid angle subtended by the surface of sphere at the center is  
 (a)  $\pi$  (b)  $2\pi$  (c)  $4\pi$  (d)  $8\pi$
- (10) The spectral radiant energy  $Q_\lambda$  is given by  
 (a)  $dQ+d\lambda$  (b)  $dQ-d\lambda$  (c)  $d\lambda/dQ$  (d)  $dQ/d\lambda$

**Q-2 Answer the following questions in brief. (Answer any Ten Questions)**

**[20]**

- (1) What is gravity anomaly?
- (2) Write a short note on gravitational acceleration.
- (3) State the Newton's universal law of gravitation.
- (4) Write a short note on Rayleigh waves
- (5) Write a short note on seismic waves.
- (6) Write a short note on L waves.
- (7) Define spectral bands.
- (8) Write a short note on digital techniques of data analysis.
- (9) How is a radian related to a degree?
- (10) Define solid angle.
- (11) What is active and passive remote sensing?
- (12) Enlist the different radiometric quantities.

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- Q-3 (a) Explain the effect of latitude and the elevation on the gravity survey. [5]  
(b) Explain in detail about how gravitational acceleration 'g' is related to geology. [5]

OR

- Q-3 (a) Explain about gravity data reduction and hence define Bouguer anomaly. [5]  
(b) Discuss in detail about Magnetic Survey. [5]

- Q-4 (a) Write a note on reflection of seismic waves. [5]  
(b) Write a note on refraction of seismic waves. [5]

OR

- Q-4 What are seismic waves? Discuss the different types of seismic waves in detail. [10]

- Q-5 (a) Discuss the role of sun and atmosphere in remote sensing. [5]  
(b) Discuss the different stages of remote sensing in detail. [5]

OR

- Q-5 (a) Derive the equation for the velocity of electromagnetic radiation. [5]  
(b) What are remote sensors? Discuss the different types of resolutions provided by them. [5]

- Q-6 (a) Define radiometric quantities and explain about Radiant Flux and Irradiance. [5]  
(b) State Kepler's laws of planetary motion and explain them with the help of schematic diagrams. [5]

OR

- Q-6 (a) Discuss the concepts of Radiant Energy and Radiant Intensity in detail. [5]  
(b) Discuss the concept of solid angle in detail and hence describe the measurement geometry of remote sensing system. [5]

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