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SRI LANKA SURVEY DEPARTMENT

Promotion Examination from Class II 'B' to Class II 'A' of Sri Lanka Technological Service Officers – 2014

Remote Sensing I

(For Remote Sensing Technicians)

2014.06.28 Time: Three (03) hours 0900 – 1200 hours

Answer all Questions. (Each question carries equal marks)

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1. (i) Explain, with or without examples, how ground-based and remote sensing methods may complement each other.

   (ii) What are the differences between active and passive remote sensing systems? Discuss the pros and cons of these systems.

   (iii) Mention two types of passive and active sensors for each.

   (iv) Which aspects need to be considered to assess if the statement "RS data acquisition is a cost-effective method" is to be true?

2. (i) What is the electromagnetic spectrum?

   (ii) List and define the three types of atmospheric scattering?

   (iii) In your own words give a definition of an atmospheric window.

   (iv) What specific energy interactions take place when EM energy from the Sun hits the Earth's surface?

3. (i) List and briefly describe four characteristics of image data.

   (ii) One 8-bit pixel takes up one single byte of computer disk space. One kilobyte (Kb) is 1024 bytes. One megabyte (Mb) is 1024 kilobytes. How many megabytes of computer disk space would be required to store an 8-bit *LANDSAT Thematic Mapper* (TM) image (7 bands), which is 6000 pixels by 6000 lines in dimension?

   (iii) *LANDSAT* satellite has a spatial resolution of 15m and an altitude of 700 km. Calculate the IFOV (instantaneous field of view) corresponding to the spatial resolution for the sensor.

4. (i) Calculate the scale factor for an aerial photo taken at 2500 m height by a camera with a focal length of 88 mm.

(ii) Consider a (monochrome) black-and-white film. What determines the general sensitivity of this film and why is it important?

(iii) Which factors determine the scanning density of an aerial photograph?

(iv) Explain the dead ground effect (Properly labeled diagram is sufficient).

5. (i) Give the following specification of *ALOS* and *QuickBird* Satellite sensors

(a) Resolution

(b) Bands

(c) Altitude

(ii) *ALOS* satellite had remote sensing instrument which capable for forward, nadir and backward looking. What is the advantage of this capability? How we can use it in mapping activities?

(iii) This satellite used push-broom scanners. Explain the principle of push-broom scanner.

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Promotion Examination from Class II 'B' to Class II 'A' of Sri Lanka Technological Service Officers – 2014

Remote Sensing II

(For Remote Sensing Technicians)

2014.06.28 Time: Three (03) hours 1300 – 1600 hours

Answer all Questions. (Each question carries equal marks)

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1. (i) What is meant by map projection?

   (ii) What are the four (04) major properties of map projection?

   (iii) What are the two (02) projecting methods that can be used in map projection?

   (iv) List out the three (03) basic types of map projections used in making maps?

   (v) Name the map projection used in creating topographic maps in the Survey Department of Sri Lanka. What properties are mainly preserved in using that projection?

2. (i) What is *map generalization*?

   (ii) List out eight (08) generalization operators?

   (iii) Categorize generalization operators listed in (ii) above into independent and contextual operators.

   (iv) Why resolving *topological conflicts* are necessary in automatic map generalization?

   (v) When the target scale of the generalized map is significantly small from the source map scale, which *generalization operators* are mostly suitable?

3. (i) Explain the difference between *additive* and *subtractive* colours?

   (ii) Which *colour space* is best fitted with our intuitive perception?

   (iii) If cyan and yellow colour is mixed for painting, which colour would you get?

   (iv) How do you distinguish between *true colour composite* and *false colour composite*?

   (v) Which colour system do you apply for printing?

4. (i) What are the three (03) major segments in *Global Positioning System* (GPS)?

(ii) List out the advantages in using GPS.

(iii) Write down five (05) errors that are associated in determining position with GPS?

(iv) What is *Selective availability* in GPS?

(v) Explain briefly the mechanism in determining position of a new control point using real-time differential GPS from an existing known control point with higher planimetric accuracy which is 25*km* away from the new control point in a project area.

5. (i) What is a *thematic map*?

(ii) Explain briefly the four (04) data scales that are used in representing details on a map

(iii) What are the two types of symbols used in a *qualitative map*?

(iv) List out the advantages and disadvantages in using each of these two types of symbols mentioned in (iii) above.

(v) In a quantitative map of the scale of 1 : 10,000, a single dot symbol is to be represented an area of one (01) hectare on ground. Determine the size of this dot symbol in radius on this map.