NOTE FROM THE AUTHOR ON GRADING:

Partial credit is suggested for Section II, but is not necessary. To administer partial credit, 3 points is to be awarded for a correct answer, 2 points is to be awarded for an answer within one year of being correct, and 1 point is to be awarded for an answer within two years of being correct. The exception is question 21- no partial credit is to be given on this question, since everyone should know what date Sputnik was launched: It’s the most important date in remote sensing.

Elsewhere on the test, especially on the short answer questions, partial credit is awarded for reasonably close answers.

The highest score on this test at competition was a 61; any score above 30 would have been in medal range. If you decide to add partial credit in Section II, a good score would be about 50 and I would expect the top score to be 75 or a little above. (This depends, of course, on when and where a competition would be held).

If you are planning to take this test for practice, good luck. I hope you have as much fun taking the test as I did writing it.

SECTION I

1. A, B, C, D, and E

2. E

3. C

4. A

5. D

6. C

7. A

8. D

SECTION II

9. 2007 (Also award two points if their answer was incorrect, but within 21-25 years after their answer for “Landsat 5 is launched”)

10. 1978

11. 1972

12. 1960

13. 1984

14. 1997

15. 2012

16. 1975

17. 2002

18. 1999

19. 1982

20. 1964

21. 1957 (No partial credit)

22. 1958

23. 1993

SECTION III

24. Radio Detection and Ranging

25. Light Detection and Ranging

26. Sound Navigation and Ranging

27. Moderate-resolution Imaging Spectroradiometer

28. Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations

29. Geostationary Operation Environmental Satellite

30. Gravity Recovery and Climate Experiment

31. Sea-viewing Wide Field-of-view Sensor

32. Light Amplification by Stimulated Emission of Radiation

33. Tropical Rainfall Measuring Mission

SECTION IV

34. Remote Sensing

35. Geosynchronous Orbit

36. Sun-synchronous Orbit

37. Geostationary Orbit

38. Swath

39. Temporal Resolution

40. Spatial Resolution

41. Active Sensor

42. Albedo

43. Scale

44. Hydrologic (Water) Cycle

45. The Electromagnetic Spectrum

46. Radiometric Resolution

47. NDVI (Normalized Difference Vegetation Index)

48. Spectral Resolution

SECTION V

IMAGE A

49. The left image

50. Clouds

51. 7600 mi2 (5 points 7500-7700, 4 points 7350-7850, 2 points 7000-8000, 1 point 6000-9000)

52. 2nd band: 0.52-0.6 µm; 4th band: 0.76-0.9 µm; 7th band: 2.08-2.35 µm

IMAGE B

53. Hurricane Katrina (award one point for simply “a hurricane”)

54. The city is flooded

IMAGE C

55. Magenta

56. The image is of a floodplain, so the blue-green sections represent riparian vegetation (aquatic plants)

57. The stress is caused by human settlement, hunting, fishing, and/or cattle grazing. (Must have 2, 2 points) The conservation regulations are ineffective because many residents of the area rely solely on the wetlands to support themselves, as they are affected by poverty. (3 points)

IMAGE D

58. 3572 mi2 (5 points 3250-3750, 4 points 3000-4000, 2 points, 2500-4500, 1 point 2000-5000)

IMAGE E

59. False-color

60. Hypersalinity (Niau contains an extreme amount of salt)

SECTION VI

61. Students should have the following on their answer sheets:

|  |  |  |  |
| --- | --- | --- | --- |
|  | NDVI | EVI |  |
| 3 pts | mbox{NDVI}=\frac{(\mbox{NIR}-\mbox{VIS})}{(\mbox{NIR}+\mbox{VIS})} | **VI= G \times \frac{(NIR-RED)}{(NIR+C1 \times RED-C2 \times Blue+L)}** | 3 pts |
| 3 pts\* | NDVI = (0.37-0.16) (0.37+0.16) | EVI=2.5 \* (0.37-0.16) (0.37+6\*0.16-7.5\*0.11+1) | 4 pts\* |
| 3 pts | NDVI = 0.40 | EVI = 0.35 | 3 pts |

\*Award full credit for the second step if the correct values are identified for variables but the wrong equation is used.

NIR = 0.37

RED/VIS = 0.16

BLUE = 0.11

62. EVI