

**Indian Institute of Technology**

Date..... Time **2 hours**..Full Marks...**60**.....No. of Students:..**27**.....  
Mid-Spring Semester 2009-2010 Dept. of **Geology&Geophysics**  
Subject No **EX31006/EX43008**...**3<sup>rd</sup>** year M.Sc. (Exploration Geophysics) **1<sup>st</sup>** year M.Sc. (Geophysics)..... Subject name **Gravity & Magnetic Methods of Prospecting**.....

**Instruction:** Answer all the questions. Marks are given on the right hand side of the question.

1. a) How would you tell if an area is in isostatic equilibrium through gravity observations? (2)  
b) A ship is steaming eastward at 20 knot at latitude  $45^\circ$ , by how much does the value of gravity measured on the ship differ from the value that would be measured on a stationary platform? (2)  
c) What is the value of  $g$  at the north pole, given  $g$  at the equator is  $9.78\text{cm/sec}^2$ ? (2)  
d) If you took a gravimeter 1 km down a mine in rocks of density  $2.3\text{ g/cm}^3$ , how the gravity would change? (2)  
e) Compare to the Earth, the mass of the Moon is about  $1/80$  and its radius a quarter. How does its surface gravity compare? (2)
  2. Derive the expression for gravity anomaly over a sphere. Correlate the half- width of the gravity anomaly caused by a sphere to the depth of the center of the sphere. (10)
  3. What are the ambiguities in gravity data interpretation? What are regional and residual anomalies? Derive the second derivative and show how the residuals anomalies came up that normally hidden by strong regionals? (2+3+10=15)
  4. Two survey vessels with shipborne gravity meters are steaming at 6 knots in opposite directions along an east-west course. If the difference in gravity read by the two meters is  $63.5\text{ mgal}$  as the ships pass, what is the latitude? (5)
  5. What does a spring of zero length means? Describe any LaCoste-Romberg gravimeter with special reference to its basic principle and sensitivity. (10)
  6. Briefly discuss various corrections applied to land gravity data. (10)
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