



FEDERAL UNIVERSITY OF TECHNOLOGY
SCHOOL OF ENVIRONMENTAL TECHNOLOGY
DEPARTMENT OF SURVEYING & GEOINFORMATICS

POSTGRADUATE PROGRAMME

MTECH: FIRST SEMESTER EXAMINATION 2019/2020 SESSION

COURSE TITLE: Physical Geodesy **COURSE CODE:** SVG711 **CREDIT UNIT:** 3 **TIME** 2hrs

INSTRUCTION: Answer any **THREE (3)** Questions

- Q1. a). Briefly explain geodetic Boundary Value Problem (BVP). **5 Marks**
- (ii) Identify the three main principles of BVP and discuss the boundary value problem of Physical geodesy. **5 Marks**
- (b). Discuss the gravity field outside the earth and state its practical essence. **10 Marks**
- Q2. a). Relate the Stoke's boundary value problem to the concept of regularized geoid. **5 Marks**
- (b). Determination of the figure of the earth is the cardinal goal of physical geodesy. Briefly explain how the following approaches have contributed to the realization of this goal: (i). Gravimetric geoid approach, (ii). Astrogeodetic geoid approach and (iii). GNSS/Levelling geoid method. **15 Marks**
- Q3. a). What is gravitational and centrifugal potentials? Give the three properties of gravitational potential; show relevance equations where necessary. **10 Marks**
- (b). Identify the expression $N = \frac{T}{\gamma}$ and state its significance in physical geodesy. **5 Marks**
- (ii). Distinguish between gravity and gravitation **5 Marks**
- Q4. a). What do you understand by gravity gradiometry? Using appropriate illustrations, explain how conventional gravity differs from gravity gradiometry measures? **10 Marks**
- (b). Identify the two main types of Lockheed Martin gravity gradiometers and give their basic differences. Provide the predominant areas of application of gravity gradiometry. **10 Marks**
- Q5. "If geodetic boundary value problem is generally concerned with the determination of the surface, S of the earth given the values of gravity potential, W and vector \bar{g} at every point on the surface S then, the problem is solvable with gravity distribution over the whole earth known". Discuss in terms of: (i). The Stoke's method of solution for the geoid (Stoke's BVP) and (ii). The Molodensky's method of solution for the physical earth's surface. State the limitations of each method. **20 Marks**

Good Luck!