Tribhuwan University

Institute of Engineering

Pulchowk Campus

Syllabus for the Position of Chief Technician Assistant

(*Civil Engineering***)**

S.N.	Paper	Question Format	Full Marks	Number of Questions	Exam Time
1.	**Paper I**	Core Course (Objective)	50	50	50 minutes
2.	**Paper II**	Core Course (Theory)	50	10	1 ½ hrs
Total Written Exam Full Marks:			**100**		

Paper I: Objective (Core Course) Marks: 1 × 50 = 50

Unit	Area of Questions	Marks	No of Question	No of question × marks
1	Construction Materials	10	50	50 questions × 1 marks
2	Engineering survey	10		
3	Fluid Mechanics and Hydraulics	5		
4	Highway Engineering	5		
5	Estimating and costing	10		
6	Soil Mechanics	5		
7	TU Laws 2049, TU Teacher and Officers Service laws (2050) (Section 5,6,9, and 10), TU Economic Management and Procurement laws (2050) (Section 12, 13 and 14)	5		
	Total Marks =	50	50	

Paper II: **Core Course** **Marks: $5 \times 10 = 50$**

Subjective Knowledge

Unit	Area of Questions	Marks	No of Question	No of question × marks
1	Construction Materials	10	2	10 questions × 5 marks
2	Engineering survey	10	2	
3	Fluid Mechanics and Hydraulics	5	1	
4	Highway Engineering	5	1	
5	Estimating and costing	10	2	
6	Soil Mechanics	5	1	
7	TU Laws 2049, TU Teacher and Officers Service laws (2050) (Section 5,6,9, and 10), TU Economic Management and Procurement laws (2050) (Section 12, 13 and 14)	5	1	
	Total Marks =	50	10	

1. **Construction Materials:**
   Type of construction materials available in different part of Nepal; Properties of construction materials: physical, chemical, constituents, thermal etc.; Stone: Types, characteristics and requirements of stones as building materials. Required tests to confirm their strength and durability; Brick: Types, properties of good bricks and requirements of bricks as building materials. Required tests to confirm their strength and durability; Ceramic materials: Ceramic tiles, mosaic tiles, their uses and tests to confirm strength and durability; Cementing materials: Types and properties of lime and cement. Constituents of lime and cement mortars, their uses and required tests to confirm their strength and durability; Metals: Steel; types and properties; alloys their uses and tests. Aluminum, its properties, uses and tests; Timber and wood: Different timber trees in Nepal, types and properties of wood, their uses and necessary tests; Miscellaneous materials: Asphaltic materials (Asphalt, Bitumen and Tar); paints and varnishes; polymers; composites, etc.
2. **Engineering Survey**
   Introduction, importance and basic principles of surveying; Linear measurements: techniques; chain, tape, ranging rods and arrows; representation of measurement and common scales; sources of errors; effect of slope and slope correction; correction for chain and tape measurements; Abney level and clinometers; Compass and plane table surveying: bearings; types of compass; problems and sources of errors of compass survey; principles and methods of plane tabling; Leveling and contouring: Principle of leveling; temporary and permanent adjustment of level; bench marks; booking methods and their reductions; longitudinal and cross sectioning; reciprocal leveling; trigonometric leveling; contour interval and characteristics of contours; methods of contouring; Theodolite traversing: Need of traverse and its significance;

computation of coordinates; adjustment of closed traverse; closing errors; Uses of Total Station and Electronic Distance Measuring Instruments; Importance of GIS in surveying; total station and its uses.

3. **Fluid Mechanics and Hydraulics:**
   Introduction: Fluid, Fluid Mechanics and Hydraulics; Properties of fluid; Hydrostatics: Hydro kinematics: Hydrodynamics: Flow Measurement: Pipe Flow: Open Channel Flow:
4. **Highway Engineering**
   Highway Alignment and Engineering Survey: Introduction; Requirements of ideal highway alignment; Factors controlling highway alignment; Engineering survey for highway alignment; Map study; Reconnaissance; Preliminary survey; Final location and detailed survey; Geometric Design of Highways: Cross sectional elements; Camber; Highway curves; Superelevation; Extra widening; Sight distance; Gradient; Vertical curves; Highway Drainage: Requirements of good drainage system; Classification of highway drainage system; Highway Materials: Classification of highway materials: Introduction, Classification based on purpose binding, mineral, other minerals; Subgrade soil; Stone aggregates; Binding materials (bituminous material): Road Pavement: Hill Roads: Road Machineries: Road Construction Technology: Highway Maintenance and Repair:
5. **Estimating and costing**
   Introduction; Definition of Estimating ; Purpose of Estimating; Types of Estimates: Estimation of Building; Analysis of Rates; Estimate of Road construction: Analysis of Rates of Road, Sanitary and Water supply Works; Property Valuation: Specifications; Estimating of Water Supply and Sanitary Works; Estimating of Irrigation Works; Analysis of Rate for Irrigation and Suspension Bridges:
6. **Soil Mechanics**
   Properties of soil; Factors influencing the choice of foundation; Soil compaction, effective stress and compressibility of soils; Shear strength of soils and slope stability; Lateral earth pressure in soils; Bearing capacity and settlement of foundations; Design of isolated footings, combined footings and raft foundations
7. **TU Rules and Regulations**
   TU Laws 2049, TU Teacher and Officers Service laws (2050) (Section 5,6,9, and 10), TU Economic Management and Procurement laws (2050) (Section 12, 13 and 14)

द्रष्टव्य :

1. लिखित परीक्षाको लागि ५० पूर्णाङ्कको एक पत्र हुनेछ ।

2. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नको विकल्प छनौट गर्दा गलत विकल्प छानेमा ऋणात्मक मूल्याङ्कन (Negative Marking) गरिने छ । अर्थात् यसरी मूल्याङ्कन गर्दा प्रत्येक गलत उत्तरको लागि २० प्रतिशत अङ्ककट्टा गरिनेछ । बहुवैकल्पिक प्रश्नको २० प्रतिशत अङ्क प्राप्ताङ्कबाट घटाइने छ । (उदाहरणका लागि परीक्षार्थीले २० अङ्कको बहुवैकल्पिक प्रश्नमा १५ प्रश्नको सही उत्तर र ५ प्रश्नको गलत उत्तर दिएमा निजको प्राप्ताङ्क (०.२० × ५=१.००) अर्थात् १५–१= १४ अङ्क हुनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

3. विषयगत प्रश्नको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।

4. प्रत्येक पत्रको उत्तीर्णाङ्क पूर्णाङ्कको ४० प्रतिशत हुनेछ ।

5. भाषा विषयबाहेक अन्य विषयका लागि उत्तरको माध्यम अंग्रेजी वा नेपाली हुनेछ ।