Tribhuwan University

Institute of Engineering

Pulchowk Campus

Syllabus for the Position of Chief Technical Assistant

(*Mechanical Engineering***)**

S.N.	Paper	Question Format	Full Marks	Number of Questions	Exam Time
1.	**Paper I**	Aptitude Test + Core Course (Objective)	20 +30	50	50 minutes
2.	**Paper II**	Core Course (Theory + Practical)	40 + 10	4	1 ½ hrs.
Total Written Exam Full Marks:			**100**		

(Detail Syllabus)

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

Unit	Area of Questions	Marks	No of Question	No of question × marks
1	Workshop Practice	8	50	50 questions × 1 marks
2	Engineering Drawing	5		
3	Thermodynamics	8		
4	Engineering Mechanics	7		
5	Strength of Material	7		
6	Fluid Mechanics	5		
7	Basic Electrical Concept	5		
8	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 × 8 = 40

Subjective Knowledge

Unit	Area of Questions	Marks	No of Question	No of question × marks
1	Workshop Practice	10	2	8 questions × 5 marks
3	Thermodynamics	5	1	
4	Engineering Mechanics	5	1	
5	Strength of Material	5	1	
6	Fluid Mechanics	5	1	
7	Basic Electrical Concept	5	1	
8	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 =	40	8	

1. Workshop Practice

1.1 Measuring Instruments - Scale, Try square, Bevel Protractor, Vernier Caliper, Micrometer, Gauges and Filler Gauges, Metric, FPS and SI Unit
1.2 Hand tools and their applications
1.3 Basic knowledge of Lathe, Milling, Shaper, Grinding and Drilling Machine
1.4 Introduction to gas welding and arc welding, soldering

2. Engineering Drawing

2.1 Orthographic projection
2.2 Sectional views
2.3 Machine drawing: Assembly and detailed drawing
2.4 Limits and fits

2.5 Standard symbols: welding symbols, pipe and fittings symbols, electronics and electrical symbols

3. Thermodynamics

3.1 Basic Concept of Thermodynamics: Thermodynamic system, Thermodynamic properties, process
3.2 Laws of thermodynamics: First law and second law of thermodynamics
3.3 Basic Thermodynamic Processes: Constant volume process, Constant pressure process, Constant temperature process, Adiabatic process, Polytropic processes
3.4 Modes of heat transfer (conduction, convection and radiation)
3.5 Air compressor: Single stage reciprocating compressors: construction, working principle, Centrifugal compressors: construction, operation and working principle

4. Engineering Mechanics

4.1 Scalars and vectors
4.2 Statics: force systems, equilibrium of particles and rigid bodies
4.3 Friction (dry friction, applications)
4.4 Centroid and moment of inertia
4.5 Dynamics: kinematics and kinetics of particles (basic concepts)

5. Strength of Materials

5.1 Stress and strain (axial, shear, bending)
5.2 Elastic constants and stress–strain diagrams
5.3 Factor of safety
5.4 Theory of simple bending
5.5 Torsion

6. Fluid Mechanics

6.1 Properties of Fluid: Density, specific volume, specific weight and specific gravity, viscosity, Surface tension and capillarity
6.2 Fluid Static: Fluid pressure, fundamental equation of fluid static and pressure head, Simple type manometer: classification and working
6.3 Basic equations of fluid flow: Continuity equation, Bernoulli's equation, Momentum equation

7. Basic Electrical concept

7.1 Basic concepts: Concept of resistance, inductance and capacitance,
7.2 Series and parallel combination of resistors, inductors and capacitors
7.3 Kirchhoff's Law and their application
7.4 Transformer: construction and working principle

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 :

१. लिखित परीक्षाको लागि ५० पूर्णाङ्कको एक पत्र हुनेछ ।

२. 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 ।

३.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 ।

४. प्रत्येक पत्रको उत्तीर्णाङ्क पूर्णाङ्कको ४० प्रतिशत हुनेछ ।

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