

नेपाल सरकार
शिक्षक सेवा आयोग
माध्यमिक शिक्षकको अध्यापनअनुमतिपत्रको लिखित परीक्षा पाठ्यक्रम, २०७५

(क) पहिलो पत्र : Electrical Engineering

- ६५ अङ्क

Introduction

This course consists of basic knowledge about electrical engineering. It deals with the generation to utilization of electrical energy. It is focused on the different types of machines, motors and instruments along with their working principle and applications. It gives concept of the wiring techniques and control mechanism with their types.

Objectives

- Acquire basic knowledge and skills related to electrical engineering concept.
- Gain knowledge about the generation, transmission, distribution and utilization of electrical energy.
- Identify different types of motors and their principles.
- Know the different types of instruments, their working principle and applications.
- Identification of different luminaries & estimate the lighting calculation and design.

Part : I

40 marks

1. Introduction

1.1 Basic Electrical Engineering

- 1.1.1 Electrostatics
- 1.1.2 Electric Circuits
- 1.1.3 Capacitors
- 1.1.4 Magnetism and Electromagnetism
- 1.1.5 AC circuits (Single phase and three phase circuit)

1.2 Basic Electronics

- 1.2.1 Introduction
- 1.2.2 Passive components
- 1.2.3 Semi-conductor
- 1.2.4 Rectifier
- 1.2.5 Transistors
- 1.2.6 Logic gates and Boolean algebra

2. Electrical Installation and Measurements

2.1 Instrumentation

- 2.1.1 Current and voltage measuring instrument
- 2.1.2 Resistance, capacitance and inductance measurement
- 2.1.3 Shunts and multipliers
- 2.1.4 Potentiometers
- 2.1.5 Power, Energy and frequency meter
- 2.1.6 Transducers

2.2 Machine

- 2.2.1 Transformer
- 2.2.2 DC machine
- 2.2.3 Three phase induction machine
- 2.2.4 Synchronous machine
- 2.2.5 Single phase fractional horse power machines

2.3 Industrial Installation

- 2.3.1 Power supply
- 2.3.2 Test inspection and testing
- 2.3.3 Earthing
- 2.3.4 Single phase and three phase distribution system
- 2.3.5 Alternator
- 2.3.6 Industrial wiring

3. Industrial and Commercial Installations

3.1 Utilization and installation of commercial buildings

- 3.1.1 Generation, transmission and distribution of energy
- 3.1.2 Illumination and lighting design
- 3.1.3 Types of luminaries and lighting schemes
- 3.1.4 Cables and terminations
- 3.1.5 Distribution sub-station
- 3.1.6 Emergency and backup supply

3.2 Control and Protection of power supply

- 3.2.1 Control and protection system
- 3.2.2 Isolators and Contactors
- 3.2.3 CT and PT
- 3.2.4 Circuit Breakers
- 3.2.5 Relays
- 3.2.6 Protection schemes
- 3.2.7 Short circuit MVA and current
- 3.2.8 System earthing and overvoltage protection

4. Micro Hydro and PV system

- 4.1 Introduction
- 4.2 Layout of Micro-hydro
- 4.3 Components of Micro-Hydro
- 4.4 Protection system for Micro-Hydro
- 4.5 Operation and Maintenance of Micro-Hydro
- 4.6 Introduction to PV
- 4.7 PV cell and performance parameters
- 4.8 Components and application of PV
- 4.9 Operation and Maintenance of PV

Paper : II

25 Marks

5. Curriculum Related Knowledge

- 5.1 Space of relevant subject in electrical engineering in secondary school curriculum.
- 5.2 Breadth/Depth of the content
- 5.3 Knowledge of competences and learning outcomes
- 5.4 Resource materials of relevant subjects of electrical engineering in secondary level.

6. Classroom Teaching Skills

- 6.1 Class room management skills
- 6.2 Effective Presentation Skills/Exposition
- 6.3 Problem Based Learning Strategies
- 6.4 Small Group Discussion/Whole Class
- 6.5 'Observation' as an instructional strategy

7. Use of 'Projects' and 'Field Works' in Instruction

- 7.1 Designing projects
- 7.2 Implementing and Communicating
 - 7.2.1 Reporting/Presentation
 - 7.2.2 Exhibition

8. Assessment in teaching

- 8.1 Knowledge of assessment plan and specification grid in school curriculum
- 8.2 Developing test and appropriate tools for student assessment.
- 8.3 Authentic assessment to measure performance. (Use of rubrics)

9. Use of ICT

- 9.1 ICT as CPD (Information retrieve/ search/ manage, knowledge of ICT copetences)
- 9.2 ICT as content enhancement (Use of various ICT tools to explore different topics of engineering and terminologies)
- 9.3 ICT as delivery tool (Mobile, Multimedia software, online materials, games in classroom for specific contents)

Specification Grid.

Units	Mark Distribution						Total Q	Total Marks
	Objective Question			Subjective Question				
	No.of Q.	Marks	Total Marks	No.of Q.	marks	Total Marks		
1	7	1	7	-	-	-	7	7
2	13	1	13	-	-	-	13	13
3	13	1	13	-	-	-	13	13
4	7	1	7	-	-	-	7	7
5	-	-	-	1	5	5	1	5
6	-	-	-	1	5	5	1	5
7	-	-	-	1	5	5	1	5
8	-	-	-	1	5	5	1	5
9	-	-	-	1	5	5	1	5
Total	40	1	40	5	5	25	45	65

द्रष्टव्य :

१. प्रश्न पत्र तयार गर्दा संज्ञानात्मक तहका सबैजसो क्षेत्र समेटिने छन् ।
२. विषयगत प्रश्नहरूमाफत सिर्जनशीलता र शिक्षणसँग सम्बन्धित व्यावहारिक पक्षहरू मापन गर्ने उद्देश्य राखिने छ ।
३. कण्ठस्थ गरी दिइएका जवाफभन्दा शिक्षण सिकाइसँग सम्बन्धित व्यावहारिक पक्षहरूको विश्लेषण/विवेचना तथा समस्याको समाधान गर्दै दिइएका मौलिक तथा सिर्जनात्मक उत्तरलाई प्रोत्साहित गरिने छ ।
४. खण्ड (ख) अन्तर्गतका शिक्षणकलासँग सम्बन्धित प्रश्नहरू खण्ड (क) मा दिइएका विषयहरूको व्यवहारिक पक्षसँग जोडेर तयार गरिने छन् ।
५. लामो उत्तर आउने प्रश्नहरू शिक्षणमा सूचना प्रविधिको प्रयोगलाई समेत ध्यान दिइने छ ।