ASSISTANT RURAL ELECTRICIAN (ASRE)

Core Qualification File Syllabus

Learning Outcomes	Theory	Practical
1. Able to recognize single phase and three phase AC transmission systems and its components. 14 (Th-6+ Pr-8)	1.1 Interpret the structure of power transmission in rural area.	
	1.2 Define standard Low, Medium, High & Extra high voltage.	
	1.3 Define power in AC transmission systems. Use the expressions for power calculation.	
	1.4 Differentiate the criteria between single phase & 3-phase supply lines.	
	1.5 Interpret the criteria of 3-phase balanced & unbalanced load and their use in practical circuits.	
	1.6 Identify 3-phase 3-wire & 3-phase 4-wire system and distinguish them.	
	1.7 Classify the types of transmission line according to distance. Interpret the criteria of each line.	
	1.8 Identify physically different transmission line components and their effects in transmission line performance.	
		1.9 Draw the layout diagram of the low voltage transmission line installation & make a list of materials for the scheme.
		1.10 Draw the layout diagram of the medium voltage transmission line installation & make a list of materials for the scheme.
		1.11Know the procedure of installation of low and medium voltage transmission line in rural area. Apply it in practical field.
2. Able to recognize different types of AC distribution systems and its components. 14 (Th-6+ Pr-8)	2.1 Differentiate between feeder & distributor.	
	2.2 Recognize the types of A.C Distribution - Primary & Secondary distribution System and their application.	
	2.3 Identify overhead and underground distribution system and their place of application.	
	2.4 Identify different schemes of distribution system - Radial, Ring main, Interconnected system. Know the characteristics of each system and	

	place of application.	
		2.5 Draw and explain lay out diagram for Radial distribution system.
		2.6 Draw and explain lay out diagram for Ring main distribution system.
		2.7 Draw and explain lay out diagram for Interconnected system.
	2.8 Explain the importance of load power factor improvement.	
	2.9 Identify power factor improvement equipments and their specifications.	
		2.10 understand the connections of power factor improvement equipments. Apply it in practical field.
3. Able to identify different materials used in Transmission & Distribution System. 15 (Th-7+ Pr-8)	3.1 Identify different types of Pole, Towers, X-arms, Timbers, Sky pin, Arm pin, Clevis for transmission & Distribution System.	
	3.2 Identify different types of insulators- Pin, Strain, Disc, Shackle, Gay. Understand the construction of each type and their place of applications in power line.	
	3.3 Recognize size & types of conductors and its application in transmission & distribution system. Know the specification of the conductors for procurement.	
	3.4 Identify guying materials, anchoring materials, different connectors, lightning arrester. Understand the operation and specification of each item and their place of applications.	
	3.5 Identify and specify different types of fuses, isolators. Know the construction and operation of each item. Use the devices in practical field.	
		3.6 Know the fixing method of various Nuts & Bolts that are used for transmission line erection.
		3.7 Install panel board of low voltage distribution.
		3.8 Identify the faults in the panel board of low voltage distribution and repair it with specified components.
	3.9 Explain the constructional difference of overhead and underground cable.	
4. Able to identify and	4.1 Select the parameters for site & route selection for erection of	

erect transmission line components. 14 (Th-6+Pr-8)	transmission line.	
	4.2 Make a fixture to survey line route of transmission system.	
	4.3 Make arrangements for fixation of pole of overhead lines. Follow the I.E rules for selection of pole locations and pole height.	
	4.4 Understand the erection procedures of pole, Stay wire, Cross arm, Insulators etc.	
	4.5 Select conductor material for transmission line as per I.E. rules.	
		4.6 Understand the procedure of making different types of Joints and Jumper as per I.E. rules. Apply them in practical field.
		4.7 Know the calculation of sagging of transmission line. Apply the method in practical field.
		4.8 Conductor Spacing, Line Guard materials & their fixing as per I.E. rules.
	4.9 Earthing of all metal supports of overhead lines as per I.E. rules.	
		4.10 Make arrangements for installation of different types of overhead insulator.
	4.11 Explain methods of plate and pipe earthing.	
	4.12 Identify different tools & equipments for erection and testing of overhead transmission lines.	
5. Able to execute work related to installation of Underground cables. 15 (Th-7+ Pr-8)	5.1 Classify types of underground cables and select it for laying as per location.	
		5.2 Plan and draw the route for underground cable laying.
	5.3 Explain different methods of cable laying.	
	5.4 Explain the methods of cable jointing & termination.	
	5.5 Identify different tools & equipments for erection and testing of underground transmission lines.	
		5.6 Lay underground cable and make jointing and earthing system.
6. Able to execute work related to installation of Street lighting and Solar Street lighting. 17 (Th-7+ Pr-10)		6.1 Plan and draw the route for street light pole erection.
	6.2 Select pole size, height and distance between poles considering uniform illumination as per BIS for street lighting.	
		6.3 Explain erection procedure of poles and its earthing. Apply it in

		practical field.
	6.4 Identify types of luminaries, lamps & their accessories.	
	6.5 Identify different parameters of street lighting in a rural area.	
	6.6 Identify different materials for Street Lighting and explain their functions.	
		6.7 Plan and draw the route of pole erection for solar street lighting.
	6.8 Select pole size/height and distance between poles for solar street lighting.	
	6.9 Select solar cell and its accessories considering illumination as per BIS.	
		6.10 Know the connections of different types of fuses and M.C.B. for street lighting. Apply it in practical field.
7. Able to execute work related to installation of Distribution Transformer (upto 100 KVA). 27 (Th-7+ Pr-20)	7.1 Know the criteria for site selection for installation of Distribution Transformer (upto 100 KVA).	
		7.2 Know the fixation of all fittings, insulators, main switch, fuse required for installation of Distribution Transformer. Apply it in practical field.
		7.3 Connect main switch, fuse, distribution transformer and earthing leads.
8. Able to execute work related to service connections for domestic and commercial purpose. 26 (Th-6+ Pr-20)	8.1 Explain the types of service connection for domestic and commercial purpose.	
	8.2 Identify materials for service connection - PVC wire, Insulator, G.I wire, Stay wire, Stay bow, Stay rod, Egg insulator, Conduit.	
	8.3 Calculate cable length for service connection.	
	8.4 Install single phase energy meter for domestic purpose.	
	8.5 Specify Single phase & 3-Phase Energy meter, Cut-out.	
	8.6 Specify TPIC with Neutral & DPIC main switch.	
		8.7 Install three phase energy meter for commercial purpose.
		8.8 Install lightning arrester for service connection.
9. Able to know different types of tariff system and the factors affecting the	9.1 Explain the terms related to tariff - Base load & Peak load, Maximum demand, Demand factor, Diversity factor, Load factor.	

tariff and make electricity bill. 16 (Th-6+ Pr-10)	9.2 Identify the type of tariff required for domestic, commercial, industrial systems.	
	9.3 Study the reading of Energy meter and calculate energy bill of given load.	
		9.4 Calculate cost of electrical energy considering the required tariff of any system.
		9.5 Practical demonstration of fuse replacement and checking of healthy line.
10. Able to know the IE Rules related with the rural electrification. 15 (Th-7+ Pr-8)	10.1 I.E. rule number – 2, 3, 6, 29, 30, 31, 32,33, 34, 35, 36, 37, 38, 41, 42, 43, 44, 45, 46, 47, 48, 50, 50A, 51, 54, 55, 56, 57, 59, 60, 61, 64, 74, 76, 77, 78, 80, 81, 82A, 84, 85, 87, 88, 89, 90, 91, 92.	
11. Able to know and apply the safety & precautions to be taken during electrical connections, erection of transmission lines, distribution lines & distribution transformer. 14 (Th-6+ Pr-8)		11.1 Apply protection against lightning surge in transmission line.
		11.2 Apply safety and protective devices for overhead lines.
		11.3 Apply protection against unused overhead lines.
		11.4 Apply safety measures for Line supports as per I.E. Rules
		11.5 Apply safety measures for erection of distribution transformer & transmission lines as per I.E. Rules.
	11.6 Identify and apply the safety measures while working on low/medium/high voltage transmission line.	

OUTCOMES

Outcomes to be assessed	Assessment criteria for the outcome
1. Recognize single phase and three phase AC distribution systems and its components.	1.1 Define and measure Voltage, Current, Power, Power Factor of a single phase A.C. system.
	1.2 Define and measure voltage, Current, Power, Power Factor of a 3phase A.C. system
	1.3. Understand relation and measure phase voltage, phase current, Line voltage. Line current in a 3 ph A.C. system
	1.4 Use test lamp to test single phase and three phase voltage (line and phase)
	1.5 Define standard Low, Medium, High & Extra high voltage.
	1.5 Identify 3-phase 3-wire & 3-phase 4-wire system
	1.6 Identify different components / accessories used in the distribution system.
2. Identify power factor improvement devices in A.C. distribution system..	2.1 Differentiate between feeder & distributor.
	2.2 Recognize the types of A.C Distribution - Primary & Secondary distribution System and their application.
	2.3 Identify overhead and underground distribution systems and their place of application.
	2.4 Illustrate with diagrams different schemes of the distribution system - Radial, Ring main, Interconnected system. Know the characteristics of each system and place of application.
	2.5 Explain the importance of load power factor improvement.
	2.6 Identify power factor improvement equipment and their specifications.
	2.7 understand the connections of power factor improvement equipment. Apply it in a practical field.
3. Able to identify different materials used in Low voltage Distribution System.	3.1 Identify different types of Pole, Towers, X-arms, Timbers, Sky pin, Arm pin, Clevis, isolators for Distribution System.
	3.2 Identify different types of insulators- Pin, Strain, Disc, Shackle, Gay and their place of applications in power line.
	3.3 Recognize size & types of conductors and its application in the distribution system. Know the specification of the conductors for procurement.
	3.4 Identify guying materials, anchoring materials, different connectors, and lightning arresters. Understand the function of each item and their place of applications.
	3.5 Identify and specify different types of fuses, their rating required at different locations in the distribution system.
	3.7 Identify the components in the panel board of low voltage distribution.
	3.8 Identify 3phase 3 wire and 3 phase 4 wire cable
	3.9 Identify the difference between overhead and underground cable.
4. Explain and perform different elements of work related to erection of components of an overhead	4.1 Explain arrangements needed for fixation of poles of overhead lines following I.E rules for selection of pole locations and pole height.
	4.2 Explain the erection procedures of pole, Stay wire, Cross arm, Insulators etc.

distribution system.	4.3 Explain requirement of Conductor Spacing, Line Guard materials & their fixing as per I.E. rules.
	4.4 Make different types of Joints and Jumper
	4.5 Make earthing of all metal supports of overhead lines as per I.E. rules.
	4.6 Install different types of overhead insulator.
	4.7 Explain methods of plate and pipe earthing.
	4.8 Identify different tools & equipment used for work related to overhead distribution lines.
5. Explain work related to installation of Street lighting	5.1 Select pole size, height and distance between poles for street lighting.
	5.2 Explain erection procedure of poles and its earthing.
	5.3 Identify types of luminaries, lamps & their accessories for street lights.
	5.4 Know the connections of different types of fuses and M.C.B. for street lighting.
6. Identify different components related to installation of Distribution Transformer (upto 100 KVA).	6.1 Identify the fixation of all fittings, insulators, main switch, fuse required for installation of Distribution Transformer.
	6.2 Connect main switch, fuse and earthing leads of distribution transformer (up to 100 KVA)
7. Execute work related to service connections for domestic and commercial purpose.	7.1 Identify materials for service connection - PVC wire, Insulator, G.I wire, Stay wire, Stay bow, Stay rod, Egg insulator, Conduit
	7.2 Calculate cable length for service connection.
	7.3 Install single phase energy meter and DPIC main switch for domestic purpose
	7.4 Install three phase energy meter with TPIC main switch for commercial purpose.
	7.5Install lightning arrester for service connection.
	7.6 Demonstrate fuse replacement and checking of healthy line
8. Calculate cost of electricity for domestic / commercial consumer from meter reading	8.1 Explain tariff for domestic and commercial users
	8.2 Study the reading of the Energy meter and calculate the energy bill of the given load.
	8.3 Calculate cost of electrical energy considering the required tariff of any system.
9. Explain safety precautions to be taken while working on distribution lines.	9.1 Explain protection against lightning surge in transmission lines.
	9.2 Explain safety and protective devices for overhead lines.
	9.3 Explain protection against unused overhead lines.
	9.4 Illustrate the safety measures while working on a low/medium distribution line.