



89. Service-lines from Overhead lines- No Service-line or tapping shall be taken off an overhead line except at a point of support:

¹[Provided that the number of tappings per conductor shall not be more than four in case of low and medium voltage connections.]

90. Earthing- (1) All metal supports and all reinforced and prestressed cement concrete supports of overhead lines and metallic fittings attached thereto, shall be permanently and efficiently earthed. For this purpose, a continuous earth wire shall be provided and securely fastened to each pole and connected with earth ordinarily at three points in every km, the spacing between the points being as nearly equidistance as possible. Alternatively, each support and the metallic fitting attached thereto shall be efficiently earthed.

²[(1A) Metallic bearer wire used for supporting insulated wire of low and medium voltage overhead service lines shall be efficiently earthed or insulated.]

(2) Each stay-wire shall be similarly earthed unless insulator has been placed in it at a height not less than 3.0 metres from the ground.

91. Safety and protective devices-(1) Every overhead line, (not being suspended from a dead bearer wire and not being covered with insulating material and not being a trolley-wire) erected over any part of street or other public place or in any factory or mine or on any consumer's premises shall be protected with a device approved by the Inspector for rendering the line electrically harmless in case it breaks.

(2) An Inspector may by notice in writing require the owner of any such overhead line wherever it may be erected to protect it in the manner specified in sub-rule(1)

³(3) [The owner of every high and extra-high voltage overhead line shall make adequate arrangements to the satisfaction of the Inspector to prevent unauthorised persons from

1. Added vide G.S.R.45, dated 23-1-1993

2. Subs.vide G.S.R. No. 732 dated 3-8-1985

3. Substituted vide G.S.R. No. 838 dated 9-8-1980

APPENDIX III

SYLLABUS FOR SKILLED PERSONS FOR ASSISTING THE OPERATION AND MAINTENANCE OF THE THERMAL POWER STATIONS

(General course for Electrical and Mechanical)

Item No.	Particulars	Number of Hours
1.	2.	3.
I	General description of thermal power stations and outline of power station operation	5
II	Fundamental units and their conversion (mechanical, electrical, thermo-dynamics)	2
III	Fuels and combustion types of fuels – their properties and testing.	1
IV	Boiler and boiler house plant and auxiliaries 1. General description. 2. Arrangement of boilers. 3. Boiler auxiliaries. 4. Boiler instrumentation. 5. Fabrication and assembly of different parts of boiler and its accessories. 6. High pressure welding in boilers. 7. Arrangement of pulverised fuel boiler in a modern thermal power station.	10
V	Water conditioning, pretreatment and demineralisation.	4
VI	Ash handling – electrostatic precipitation and mechanical dust collector-function and description of two types.	2
VII	Turbine and turbine house auxiliaries: 1. Fundamental principle of steam turbine. 2. Theory and operation of steam turbine. 3. Governing and protection of turbine.	5
VIII	Handling of turbines and boilers under emergency conditions	4
IX	Condensor and vacuum extraction plant: 1. Purpose and function. 2. Construction of surface condensor and vacuum pumps.	3
X	Regenerative feed water heating-Constructional details of low pressure and high pressure feed water heaters, deaerators and evaporators.	2
XI	Cooling water systems and cooling towers.	1
XII	Flow diagrams of basic cycles: 1. Coal handling. 2. Steam and condensate. 3. Ash and slag handling. 4. Station services, domestic water, airconditioning, ventilation, lifts. 5. Air services, air compressors, switchgear.	12

1.	2.	3.
XI	Control Room: (i) Necessity and function of a control board, types of boards, instruments on the board. (ii) Functions of the various relays and indicators, Mimic diagram indicators, annunciator and alarm characteristics of relays, testing and setting of relays. (iii) Remote control of breakers, isolators, tap changers, indicators on the control board. (iv) Control and power cables.	10
XII	Auxiliary supply: (i) Current and ampere-hour ratings of batteries, battery charging equipment, checking of specific gravity of electrolyte, maintenance of batteries. (ii) Importance of direct current supply and its functions (iii) Auxiliary direct current supply	3
XIII	Clearance and Compliance of I.E. Rules, 1956: (i) Minimum clearance for different voltages between phases and phase to ground (ii) Indian Electricity Rules pertaining to sub-stations	3
XIV	Earthing: (i) Safety earthing and system earthing, the method of earthing e.g. solid earthing, resistance earthing, peterson coil earthing, earthing of lightning arrestor, importance and advantages of each type (ii) Different types of earth electrodes, earthing mats, recommended values of earth resistance, measurement of earth resistances	3
XV	Maintenance: (i) Maintenance of log sheet and other records (ii) The importance of maintenance of good records	3
XVI	Safety: (i) Safety procedures and procedures for giving line clear and taking it back, Maintenance of records of line clear (ii) First-aid, artificial respiration and shock treatment	10
XVII	Interlocking and sequential operation of different equipments	1
XVIII	Synchronising, charging and discharging of high voltage lines. Live line testing	3
XIX	Calibration and testing of various types of equipments indicating and measuring equipments, recorders, analysers	4
XX	Handling emergency conditions	3
XXI	Diagnosing troubles in the plant from instruments and annunciation	3
XXII	Study of carrier system	2
XXIII	Auxiliary equipments such as compressors, Station lighting etc.	1
XXIV	Fire fighting equipment – their operation, maintenance and refilling	1
XXV	Personnel management, duties and responsibilities,labour welfare and labour laws	4
Total Hours		115

APPENDIX VII
(I) ASSESSMENT FORM FOR OPERATING AND SUPERVISORY STAFF

Name of the Trainee

Period : From to (extended period).

Working in

Section

Department

Particulars	Marks allotted	Marks given	Remarks
1.	2.	3.	4.
1. Punctuality and attendance	+ (5)		
(a) Is he reluctant to continue on overtime	- (1)		
(b) Is he in the habit of taking leaves at the eleventh hour	- (1)		
(c) Does he insist on compensatory off	- (1)		
2. Intelligence and grasp:			
(a) Does he have full knowledge of the plant and equipment on which he is working and follows the instructions given to him and can execute them properly	+ (10)		
(b) Is he industrious, hard working and painstaking	+ (5)		
(c) Has he shown any special skill of operation in saving plant & equipment in trouble or emergency ?	+ (10)		
3. Temperament and behaviour:			
(a) Behaviour with superiors/colleagues and subordinates	+ (5)		
(b) Capacity to take quick and correct decisions	+ (5)		
(c) Capacity to handle independent responsibility	+ (10)		
4. Any special qualifications-capacity to execute a particular or difficult job economically, intelligently, resourcefully or with special skill	+ (10)		
5. Judgment of the candidate by taking viva-voce test or by asking questions verbally	+ (40)		
Total marks	+100		

The marks may be given as below:-

Excellent	Very good	Good	Average	Below average
100-91%	90-71%	70-61%	60-51%	Below 51%

Special Remarks if any:-

Station Superintendent

Section-in-Charge

(II) ASSESSMENT FORM FOR OPERATING AND SUPERVISORY STAFF

(For use of the Training Department)

1. Name of the Trainee
2. Date of birth/age
3. Training period : From(Months)
4. Technical qualification
-
-
5. Specialisation if any
6. Practical experience
7. Marks secured in periodical tests:

Test	Date	Written (75)	Viva (25)	Total
I Test				
II Test				
III Test				
Final Test				

8. Percentage of marks secured in all the tests:
9. Gradation : (A, B, C, etc.)
10. General Remarks and Recommendations:

Director of the Institute

(III) ASSESSMENT FORM FOR SKILLED PERSONS TO ASSIST OPERATORS AND SUPERVISORS

Name of the Trainee

Period : From to (extended period).

Working in

Section

Department

Sl. No.	Particulars	Marks allotted	Marks given	Remarks
1.	2.	2.	3.	4.

1. Punctuality and attendance:
 - (a) Does he attend the duty punctually or remain absent without prior intimation frequently + (5)

	(b) Is he reluctant to continue on overtime	-(1)
	(c) Is he in the habit of taking leaves at the eleventh hour	-(1)
	(d) Is he even prepared to take leave without wages	-(4)
	(e) Whether he availed medical leave often	-(1)
2.	Intelligence and grasp:	
	(a) Does he have full knowledge of the plant and equipment on which he is working and follows the instructions given to him and can execute them properly	+(10)
	(b) Is he industrious, hard working and painstaking	+(5)
	(c) (i) Has he shown any special skill of operation in saving plant & equipment in trouble or emergency .	
	OR	
	(ii) Has he shown any special skill or innovation in any maintenance job.	+(10)
3.	Temperament and behaviour:	
	(a) Behaviour with superiors/colleagues	+(5)
	(b) Capacity to take quick and correct decisions by himself or to point out the discrepancies to superiors promptly while attending auxiliary plant and equipment.	+(5)
	(c) Capacity to take independent charge as auxiliary plant attendants (Name of the auxiliary plant)	+(10)
4.	Any special qualifications:	
	(a) Is he suitable for any other plant other than the one mentioned above at 3(c)	
	(b) Can he record the readings correctly	
	(c) Is he suitable for any particular skilled maintenance job as an artisan.	+(10)
	(d) Has he specialised in any particular trade such as winder, high pressure welding, etc.	
5.	Judgment of the candidate by taking viva-voce test or by asking questions verbally about power plant and equipment	+(40)
	Total marks	+100

The marks may be given as below:-

Excellent	91- 100%
Very good	71-90%
Good	61-70%
Average	51-60%
Below average	Below 51%
Special Remarks if any:-	
Station Superintendent	

Section-in-Charge

ASSESSMENT FORM FOR SKILLED PERSONS TO ASSIST OPERATORS AND SUPERVISORS

(For use of the Training Department)

1. Name of the Trainee
2. Date of birth/age
3. Training period : Fromto(Months)
4. Highest technical qualification
5. Specialisation, if any
6. Practical experience

7. Marks secured in periodical tests:-

Test	Date	Written (60)	Viva (40)	Total
I Test				
II Test				
III Test				

8. Job test (110 Marks)
9. Percentage of marks secured in all the tests:
10. Gradation : (A, B, C, etc.)
11. General remarks and recommendations:

Director of the Institute
