

## Question Bank for Technician Grid Substation: Operation & Maintenance (66/11 kV, 33/11 kV)

### Inspection, testing, operation and maintenance of Substation transformer (PSS/N2002)

1. Primary distribution system connects transmission system with secondary distribution system supplies power to consumer at a voltage level of: **(Medium)**
  - a. 200 V
  - b. 230 V
  - c. 250 V
  - d. 300 V
  
2. Power factor is ratio of **Medium**
  - a. kW / kVA
  - b. kVA / kW
  - c. kVAR / kW
  - d. kVAR / kVA
  
3. If reactive power (kVAR) drawn by a particular load is zero, it means the load is operating at **Hard**
  - a. lagging power factor
  - b. leading power factor
  - c. Unity power factor
  - d. None of above
  
4. The Voltage drop in transmission / distribution line depends upon **Medium**
  - a. reactance and resistance of line
  - b. current in the line
  - c. length of line
  - d. all of the above
  
5. The domestic power available in our home have 230 Volts called as LT or LV (Low Voltage). The Voltage level is classified as per regulations are as follows: **Hard**  
Low Voltage (LV): up to 650 Volt

Medium Voltage (MV): 650 V to 11000V or 11 kV  
High Voltage (HV): 11000 V to 33000 V or 11 kV to 33 kV  
Extra High Voltage (EHV): Above 33 kV i.e. 66, 132, 220 and 400 kV

- a. True
- b. False

6. Good conductors like copper, aluminium, steel have very low resistance below 1  $\Omega$  (one Ohm) whereas material like paper, wood, cloth, plastic, rubber, PVC, air, porcelain are bad conductors in dry state offer very high resistance to the tune of kilo ohm, mega Ohm and even Giga Ohm. **Hard**

- a. True
- b. False

7. AT&C losses are Aggregate Technical and Commercial loss **Easy**

- a. True
- b. False

8. Percent T & D Losses are given by **Medium**

T & D Loss % = (Energy input – Output energy billed) x 100/Energy input

9. Standard declared frequency of Alternating Current (AC) supply is required as **Easy**

- a. 47.5 Hz
- b. 49.5 Hz
- c. 50 Hz
- d. 50.5 Hz

10. 10 MW is equal to **Easy**

- a. 100 kW
- b. 1000 kW
- c. 10000 kW
- d. 100000 kW

11. Apparent power kVA =  $kW^2 \pm kVAR^2$  **Medium**

- a. True
- b. False

12. Functions of Power Distribution Company is: **Medium**
- a. Purchase of power
  - b. Distribution of power
  - c. Accounting of energy
  - d. All of the above
13. In rural areas, which type of feeder system is used? **Medium**
- a. Radial
  - b. Interconnected
  - c. Ring main system
  - d. None of these
14. Skilled workers are better job opportunities because: **Easy**
- a. They get higher wages
  - b. Their demand is high
  - c. They work better
  - d. All the above
15. Write the name at least 4 DISCOMS of different states. **Easy**
- a. **Punjab State Power Corporation Limited (PSPCL)**
  - b. **Maharashtra State Electricity Distribution Company Limited (MSEDCL)**
  - c. **Dakshin Haryana Bijli Vitran Nigam (DHBVN)**
  - d. **BSES Rajdhani Power Limited (BRPL)**
16. The Grid Substation Operation & Maintenance in distribution companies is part of **Easy**
- a. Human Resources Function
  - b. Power Purchase and Agreement
  - c. Business or commercial
  - d. All the above
17. Technician Grid Substation- Operation & Maintenance (66/11 kV, 33/11 kV) reports to: **Medium**
- a. Maintenance Officer / Foreman
  - b. Assistant Engineer O&M
  - c. Divisional Head of O&M division
  - d. None of the Above

18. The power distribution company Performs following tasks **Easy**

- a. Generation of Electricity
- b. Transmission of Electricity
- c. Distribution of Electricity
- d. None of the above

19. All employees are required to abide by the Code of conduct rules applicable to them. Employees behavior not in consonance with conduct rule is liable to attract disciplinary action **Easy**

- a. True
- b. False

20. The main purposes of Electricity Act 2003 are: **Medium**

- a. Creates competitive environment and facilitates private investment
- b. Creates liberal framework for power development
- c. Allows multiple licensing in distribution
- d. All the above

21. Switching scheme in Grid Substation consist of: **Easy**

- a. Single Bus system
- b. Single Bus with Bus Coupler or Sectionalizer
- c. Double Bus with Bus coupler
- d. All the above

22. Basic principal of working in a transformer is based on **Medium**

- a. Mutual induction between two windings
- b. Linkage of magnetic flux
- c. Mutual induced EMF
- d. All of the above.

23. In Grid substation Local /station transformers have Primary /Secondary connections vector diagram as: **Medium**

- a. Dyn11
- b. Dyn1
- c. Dd
- d. None of the above

24. Transformer losses consist of **Medium**
- a. Friction loss and Windage loss
  - b. Copper losses
  - c. Core or Iron losses
  - d. Both (b) and (c)
25. Treating of oil filtration outside transformer is for: **Hard**
- a. Drawing Particle from oil
  - b. Cleaning oil
  - c. (a) only
  - d. Both (a) and (b)
26. Moisture in transformer oil can affect: **Hard**
- a. Lower the dielectric strength
  - b. Generate bubbles
  - c. Trigger Partial Discharge
  - d. All the above
27. Treatment of transformer insulation after draining the oil requires **Medium**
- a. Vacuum treatment
  - b. Drying
  - c. Cleaning
  - d. All of the above
28. New power transformer when kept on foundation, the rollers are used for: **Hard**
- a. To drag the power transformer from foundation
  - b. To slide the power transformer from foundation
  - c. To prevent any accidental movement on rails
  - d. None of above
29. Which one of the following is a condition monitoring base maintenance? **Medium**
- a. Breakdown maintenance
  - b. Predictive maintenance
  - c. Preventive maintenance
  - d. None of above

30. The type of maintenance carried out in the event of breakdown due to malfunctioning of equipment or failure of equipment is termed as **Easy**

- a. Preventive maintenance
- b. Predictive maintenance
- c. Breakdown maintenance
- d. None of above

31. Which of the following is/are the benefits of preventive maintenance? **Medium**

- a. Reduces major system equipment's breakdown
- b. Improve services reliability
- c. Improve cost effectiveness of routine task
- d. All of the above

32. Silica gel in breather is used for absorbing moisture in air during breathing **Easy**

- a. True
- b. false

33. Silica Gel breather is one of the main protective devices of transformer **Medium**

- a. True
- b. False

34. Which one of the following is NOT a factor affecting the life of Transformer? **Medium**

- a. Earthing
- b. Oil leakage
- c. Breather
- d. None of above

35. what is the distance between two electrodes in a BDV kit? **Easy**

- a. 5 mm
- b. 2.5mm
- c. 3mm
- d. 2.5cm

36. What is the minimum permissible BDV value of oil for a 66/11KV power transformer.

**Medium**

- a. 48 KV
- b. 20 KV
- c. 60 KV
- d. 30KV

37. What types of IR testing we carry out on Power transformer?

**Easy**

- a. HV-E
- b. LV-E
- c. HV-LV
- d. All of the above

38. Tests conducted on a transformer after maintenance are:

**Hard**

- a. Ratio check
- b. AC or DC high-potential test
- c. Core loss test
- d. All of the above

39. On load tap changer ensures constant current from transformer.

**Medium**

- a. True
- b. False

40. Buchholz relay senses oil heating in the transformer.

**Easy**

- a. True
- b. False

41. Diaphragm in Conservator normally lasts 1 year.

**Easy**

- a. True
- b. False

42. The principle faults which occurs inside a power transformer are

**Hard**

- a. Insulation breakdown between winding and earth
- b. Insulation breakdown in between different phases
- c. Transformer core fault
- d. All the above

43. Technician Grid Substation maintains their record card as **Easy**
- a. Inspection record card
  - b. Equipment record card
  - c. Repair record card
  - d. All of the above.

44. On-load tap changer includes **Hard**
- a. Diverter switch
  - b. Selector
  - c. Motor Driver
  - d. All the above.

**Inspection, testing, operation and maintenance of switch gears (PSS/N2003)**

45. In Air Circuit Breaker the medium of arc quenching is: **Easy**
- a. Air
  - b. Vacuum
  - c. Oil
  - d. Gas

46. Which of following device could not trip the circuit on occurrence of fault? **Easy**
- a. RMU's
  - b. Circuit breakers
  - c. Isolator
  - d. None of above

47. Circuit Breakers are provided for **Hard**
- a. Overload protection
  - b. Under voltage protection
  - c. Short circuit protection
  - d. All of the above

48. Before operation of isolator the equipment Circuit Breaker connected with the system must be in closed (ON) position. **Medium**
- a. True
  - b. False



49. Meggar is used for measuring the **Hard**

- a. IR value
- b. Contact resistance
- c. Winding resistance
- d. All of the above

50. What types of the testing we carry out during breaker maintenance? **Hard**

- a. IR test
- b. CRM (contact resistance measurement) test
- c. Time testing (closing, open, CO)
- d. All of the above

51. The Potential transformers (PT) have following connections **Hard**

- a. Y/Y
- b.  $\Delta$ /Y
- c.  $\Delta$ / $\Delta$
- d. None of the above

52. Secondary voltage of Potential transformer (PT) is always designed for 120 V **Medium**

- a. True
- b. False

53. Secondary Current of Current transformer (CT) is always of ratio 5 or 1 Amp. **Easy**

- a. True
- b. False

54. Secondary connections of Current transformer (CT) are always made earth. **Medium**

- a. True
- b. False

55. CT's are used in substation **Easy**

- a. For protection purpose
- b. For metering purpose
- c. For both protection and metering
- d. None of the above

56. LA are designed with respect to **Medium**

- a. Line voltage
- b. Phase voltage
- c. Both of the above
- d. None of the above

57. Instrument used to prevent the high voltage entering the main station is **Medium**

- a. Control Panel
- b. Lightning Arrester
- c. Power Transformer
- d. Current Transformer

58. What should be the permissible earth resistance in Grid substations? **Easy**

- a. less than or equal to 1 ohm
- b. greater than /equal to 1 ohm
- c. 0.5 ohm
- d. 3 ohms

59. In case of emergency situation of failure of any apparatus in Grid substation. What Technician will do? **Medium**

- a. Take up the repair of apparatus with own tools
- b. Operate from the Control panel
- c. Off the switch gear
- d. Report to Substation Manager /Substation Attendant /Maintenance officer

60. Permit to work system provides in built safety to workmen engaged in electrical work.

**Easy**

- a. True
- b. False

61. Who can avail PTW to work in an electrical job? **Medium**

- a. Authorized person
- b. any Asst. Manager
- c. Any official of company
- d. all of the above

**Manage protection control system and accessories in grid substation (PSS/N2004)**

62. The relays which were designed with semi conductors & integrated circuits with no moving parts are called. **Medium**

- a. Static Relays
- b. Dynamic Relays
- c. Thermal Relays
- d. None of above

63. In Lead Acid Batteries which acid is used as electrolyte. **Medium**

- a. Nitric Acid
- b. Hydrochloric Acid
- c. Sulphuric Acid
- d. Boric Acid

64. Specific gravity of electrolyte in fully charged (100%) Lead Acid Batteries is? **Medium**

- a. 1.220 to 1.230
- b. 1.175 to 1.185
- c. 1.150 to 1.160
- d. Below 1.150

65. Cell voltage in fully charged Lead Acid Batteries is **Medium**

- a. 2.07 and above
- b. 1.5
- c. 1.2
- d. 1.0

66. Shunt capacitor generate reactive power **Hard**

- a. True
- b. False

67. Line current increases when power factor is improved **Medium**

- a. True
- b. False

68. Inductive load or inductive reactance is generated by **Medium**

- a. Transformer
- b. induction motors
- c. Florescent lighting having choke
- d. All the above

69. Any equipment / line when earthed is safe from electric shock **Medium**

- a. True
- b. False

70. Current Rating of 3X300 sq. mm, 33 kV Cables in open trench or duct is: **Medium**

- a. 102 Amp
- b. 202 Amp
- c. 302 Amp
- d. 402 Amp

71. In general condition 66 kV cable depth from Ground surface to the bottom of the cable is: **Hard**

- a. 500 mm
- b. 1000 mm
- c. 1500 mm
- d. 2000 mm

72. An Ultra probe detects high frequency sounds produced by **Hard**

- a. Arcing
- b. Tracking
- c. corona
- d. All the above

73. Thermo vision or Infrared Scanning is carried out for: **Hard**

- a. All Substation Equipment's
- b. Transmission Lines
- c. Joints and terminations
- d. All of above

74. Hotspots on the contacts & joints are identified by **Hard**

- a. Thermo vision camera
- b. Colour of insulation tape
- c. Megger
- d. Hi pot

**Health and Safety Practices for Power- related Work (PSS/N2001)**

75. In safety Tagging system DO NOT OPERATE (DNoP) TAG acts as lock. Once the tag is attached to a piece of equipment that equipment cannot be connected to known sources of electricity not even for testing purpose. **Medium**

- a. True
- b. False

76. CAUTION ORDER TAG is always used in conjunction with a PTW **Easy**

- a. True
- b. False

77. What is the most important during electrical job execution. **Medium**

- a. Safety of self and safety of others
- b. Job knowledge
- c. safety of equipment's
- d. all of the above

78. Name the PPE's (personal protective equipment) used during electrical work. **Easy**

- a. safety helmets
- b. safety gloves
- c. safety shoes
- d. safety belt
- e. all of the above

79. The ground clearance for 66 KV lines is **Hard**

- a. 6.1 m
- b. 5.8 m
- c. 4.8 m
- d. 7 m

80. What is the minimum clearance when 11- 66 kV crosses with 400 kV?

- a. 3.05 m
- b. 2.44 m
- c. 7.94 m
- d. 5.49 m

81. While climbing on ladder what should be the angle of ladder between ground and wall or pole? **Medium**

- a. At 90°
- b. At 75°
- c. At 60°
- d. At 45°

82. Safety Equipment must be carried when **Easy**

- a. Carrying out preventive maintenance work
- b. Carrying out Breakdown maintenance work
- c. Carrying out emergency repairs
- d. All the times

83. Safety precautions are observed for ensuring safety of **Easy**

- a. Our own
- b. Public
- c. Power company Assets
- d. All the above

84. Before starting a work at site, one should ensure **Easy**

- a. All required tools are available
- b. All tools are functioning properly
- c. Insulations of required tools are not damaged
- d. All the above

85. Technician wears helmet at site because? **Easy**

- a. It identifies the designation
- b. Helps to prevent head injuries
- c. It indicates the authorized Technician
- d. Colour code of company's helmet

86. Combination pliers are provided with insulation layer because? **Easy**

- a. It identifies the manufacture's name
- b. It identifies the quality of insulation grade
- c. To avoid shock
- d. To make strong grip

87. Fire triangle represents the chemical chain reaction is combination of? **Hard**

- a. Oxygen
- b. Heat
- c. Fuel
- d. All above

88. Extinguishment of fire is based upon removing or hindering any one of Oxygen, Heat and fuel from these properties of fire **Medium**

- a. True
- b. False

89. Water is used to extinguish fire of **Hard**

- a. Class A: Wood, paper, cloth, trash, plastics - solids that are not metals.
- b. Class B: Flammable liquids-gasoline, oil, grease, acetone (Includes flammable gases).
- c. Class C: Flammable gas and Live Electrical Equipment- LPG, Natural Gas, Methane, etc.
- d. Class D: Metals-potassium, sodium, aluminium, magnesium.

90. Write the full form and meaning of given abbreviation used in fire extinguishers **Hard**

Abbreviation	Meaning or Full Form
BC	Dry Chemical Extinguisher (B&C Class)
ABC	Pictorial labels of fire class A, B & C
PASS	Pull, Aim, Squeeze and Sweep

91. While working in yard of Grid substation safety zone can be created after: **Easy**

- a. Checking the supply at HT & LT terminals
- b. Using line clear permit
- c. Use of PPE, safety belt and proper tools
- d. All above

92. How you will load and unload a cable drum, transformer and other heavy equipment at site? **Easy**

- a. With the help of Crane and hook
- b. With the help of Chain pulley and Tripod
- c. With the help of wooden planks and rollers
- d. All above

93. Any burn injury larger than the palm of the victim's hand, whatever the depth, needs hospital treatment. **Easy**

- a. True
- b. False

94. In case of electrocution. The heart muscles remain live up to 1/2-hour time after shock. Hence, the artificial respiration may save the life of the shocked person. Start artificial respiration. Continue it till doctor or medical help arrives. **Hard**

- a. True
- b. False

95. How we get the electric shock? **Hard**

- a. Due to resistance of line
- b. Due to current in line
- c. Due to voltage in line
- d. Due to power flow in line

96. If one of your colleagues comes under contact of live medium / low voltage line then what will you do? **Medium**

- a. Grip his hand and drag him out
- b. Intimate to supervisor
- c. Drag him out with the help of dry cloth and rope
- d. Intimate through phone to close the line

97. In case of any accident when one of your colleagues get injured what will you do? **Hard**

- a. Intimate all of your colleagues
- b. Intimate to your supervisor
- c. Bring him to the hospital
- d. All the above



### Work Effectively with Others (PSS/ N1336)

98. Things needed to succeed in a team player **Medium**

- a. Recognise your role
- b. Take ownership of the team goal
- c. Earn trust
- d. All the above

99. What are the key elements of active listening **Easy**

- a. Pay attention
- b. Listening
- c. Feedback
- d. All the above

100. Match the following **Hard**

1.	Technical Skill	a.	Soft Skill (2)
2.	Active Learning	b.	Repairing (4)
3.	Speaking	c.	System Analyses (3)
4.	Time Management	d.	Operation & Control (1)

### On the job viva questions with answers

#### Technician Grid Substation: Operation & Maintenance (66/11 kV, 33/11kV)

S No.	Question
1	What is Primary and Secondary distribution system?
2	What is the Voltage level classified as per regulations?
3	What is the symbol of earth connection?
4	What is the symbol of inductance, how it is denoted and measured in which unit?
5	What is the symbol of resistance, how it is denoted and measured in which unit?
6	What is the symbol of capacitor, how it is denoted and measured in which unit?
7	1 micro Farad ( $\mu\text{F}$ ) is equal to how many Farad?
8	1 megawatt (MW) is equal to how many watt?
9	How Power Factor (PF) is calculated?
10	Define AT & C Loss % and how it is calculated?
11	Describe eligibility requirements for job role of Technician Grid Substation- Operation & Maintenance (66/11 kV, 33/11 kV) in terms of qualification?
12	What are the main duties and responsibilities of a Technician Grid Substation- Operation & Maintenance (66/11 kV, 33/11 kV)?

13	State reporting of Technician Grid Substation- Operation & Maintenance (66/11 kV, 33/11 kV)?
14	What best Practices to follow on Job by Technician Grid Substation- Operation & Maintenance (66/11 kV, 33/11 kV)?
15	What is Purpose for Documentation?
16	State four types of Grid Substations?
17	State biggest and major Equipment in grid substation?
18	Name the equipment's of outdoor Switchyard for 33/66kV Grid Substations?
19	Name the indoor equipment's of 33/66kV Grid Substations?
20	State on the basis of construction, transformers can be classified into two types?
21	What is the difference between Step-up transformer and Step-down transformer?
22	State the difference between Power transformer and Distribution transformer?
23	What is function of Radiator in transformer?
24	Clarify the following different types of cooling used in transformer? <ul style="list-style-type: none"> <li>• ONAN</li> <li>• ONAF</li> <li>• OFAF</li> <li>• KNAN</li> </ul>
25	What is function of Conservator in Oil filled transformers?
26	What is function of OLTC in Power transformer?
27	State the function of Silica gel breather and its components?
28	Where Buchholz Relay is used and state its function?
29	State the function of Marshalling Box in Power transformer?
30	State the function of Pressure Relief Valve in Power transformer?
31	Why On-line oil filtration of transformer oil is carried out in Power transformer?
32	What you will measure through Meggar in Power transformer?
33	In transformer oil Testing, what is BDV test and state desirable value for Power transformer?
34	What indicates low value of BDV in transformer oil?
35	State major faults in transformers?
36	What are routine minor faults occur in transformers?
37	What are advantages and disadvantage of Single Bus System?
38	What is the benefit of Single Bus Bar System with one Section?
39	How you will classify circuit breakers on the basis of the medium used for arc extinction?
40	State operating principle of High Voltage Circuit Breaker in case of tripping?
41	State the function of Isolator?
42	What is the function of Earthing Switch in switch gear?
43	State the procedures is to be followed while getting PTW of a Circuit Breaker?
44	To whom Technician Grid substation after the completion of planned/ preventive/ breakdown maintenance reports?
45	State the tests carried out in circuit breaker after completion of planned/ preventive/ breakdown maintenance?

46	Describe tripping mechanism and relays?
47	What is the function of Protective Relays used in control panel?
48	What are the current settings of over current relay and earth fault relay?
49	Describe the construction design and function of HRC fuse?
50	What are disadvantages of H.R.C Fuse?
51	State the names of Instrument transformers used in Grid Substation and where they are used?
52	How CT ratio and PT ratio are tested of CTs and PTs?
53	What is LA (lightning arrester) and state its function?
54	Clarify Anode, Cathode and Electrolyte in Lead Acid Batteries and state its function?
55	A typical 12 Volt battery has a rating of 125 AH what it means?
56	What is the function of Shunt capacitor bank in grid substation?
57	In summer during dry season when ground level water gets deeper how earth resistance is increased above the required limit?
58	Where Thermo vision or Infrared Scanning is carried out in grid Substation?
59	How many types of Cables used in Grid Substation?
60	Where control cables are used in grid substation?
61	Where power cables are used in grid substation?
62	State abbreviation of XLPE cables?
63	What is the depth of trench to lay the 11 kV HT cable?
64	State function of PLCC and SCADA system?
65	State the basic principal for safety to start any work?
66	What is the result of unsafe working condition and unsafe work?
67	What is PPE (Personal Protective Equipment)?
68	What are Safety tools?
69	How many PPE's are use in power sector?
70	State the name of PPE's which are used by Technician Grid Substation necessary to carry out their work and their significance?
71	What is the meaning of Hazards, Risks in safety?
72	Why discharge rod is important safety tool?
73	What is the difference between Accident and Near miss?
74	Explain the difference between unconsciousness and respiration fails?
75	What is Artificial Respiration (Cardiopulmonary Resuscitation) and when it is given?
76	How long the artificial respiration may save the life of the electric shocked person?
77	How electrical shock is received?
78	What are those three things that must be present at the same time to produce fire?
79	How to use a Fire Extinguisher in PASS technique?
80	State four fire (fuel) classifications: 1. Class A 2. Class B 3. Class C 4. Class D
81	Why PTW is taken?
82	What will you do when PTW from competent authority is approved?

83	Who can avail PTW?
84	State the cancellation procedure of PTW from competent authority?
85	How you will discharge the cut off line?
86	When 'Do Not Operate, Men at Work' tags are provided?
87	How you will load and unload a cable drum, transformer and other heavy equipment at site?
88	What care one should take while transporting a heavy and lengthy item like a poles or transformer, oil drums etc?
89	What is the purpose of safety cones and red flag when the cart loaded with a heavy and lengthy item is being pulled on road collectively?
90	What is Workplace Policy and Procedures?
91	By whom grievances and work-related issues of Technician Grid Substation (O&M) are resolved?
92	What is Effective communication?
93	State Importance of Teamwork?
94	What are the Key Elements of Active Listening?
95	What are effects of Poor Communication?
96	What are common reasons for Interpersonal Conflict?
97	Why positive attitude is essential?
98	How to Build self-confidence?
99	What do mean taking ownership?
100	What is time management?