STUDY MATERIAL FOR ELECTRICAL SUPERVISOR LICENSE EXAMS (DOMESTIC AND INDUSTRIAL)

Solved MCQs and Question Papers from State Electricity Board Exams for Supervisor License (Supervisor Certificate of Competency)

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QUESTION PAPER

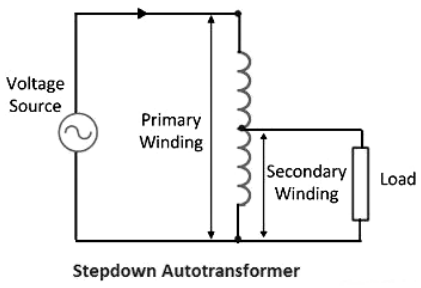
ODISHA SCC (HT) SUPERVISOR LICENSE EXAM 2019

PAPER 1

1. An ammeter has C.T. ratio 5 A and connected from the secondary of a CT of ratio 500/5 has the MF of the ammeter is
(a) 100*
(b) 1
(c) 0.01
(d) 20

2. Supply of railway traction is power is at ____ voltage
(a) 132000
(b) 440
(c) 25000
(d) 11000
Hint: In India, railway traction power is typically supplied at 25 kV (25,000 volts) AC through overhead catenary wires. This high voltage is used to reduce transmission losses and is stepped down inside the locomotive for traction motors.

3. The transformer that does not provide electric isolation is
(a) Power transformer
(b) Auto transformer
(c) Current transformer
(d) Potential transformer
Hint: An auto transformer has only one winding that serves as both the primary and secondary, with a tapped connection. Because the primary and secondary share the same winding and are electrically connected, there is no electrical isolation between input and output.



Stepdown Autotransformer

4. In induction heater the principle of heating is _____ heating.
(a) Dielectric loss
(b) Eddy current
(c) Resistance current
(d) Arc
Hint: An induction heater works on the principle of electromagnetic induction. When a high-frequency alternating current flows through a coil, it produces a rapidly changing magnetic field. This magnetic field induces eddy currents in the conducting material (work piece) placed inside the coil. These eddy currents circulate within the material and produce heat due to its resistance — this is known as eddy current heating.

5. In case of loss of permit / certificate / license, duplicate can be issued, if applied for within _____ of its expiry
(a) One month
(b) Six months
(c) One year*
(d) Two years

6. The SCCs cannot be renewed for more than _____ at a time.
(a) One year
(b) Two years*
(c) 3 years
(d) 5 years

7. A building of height more than 15 meters, with supply voltage of _____ must be to an Electrical Inspector for inspection, before charging of its electrical installation
(a) 230 V
(b) 400 V
(c) 11000 V
(d) 33000 V
Hint: According to the Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, buildings with a height of more than 15 meters must have their electrical installations inspected and certified by an Electrical Inspector before they can be charged (energized). This requirement applies specifically to installations operating at low

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voltage (LV), which in India is defined as up to 250 V for single-phase and 400 V for three-phase.

8. When two electric lines cross each other, angle between those should be____
(a) 30°
(b) 45°
(c) 60°
(d) 90°*

9. Lux is the unit of measurement for
(a) Illumination level*
(b) Luminous flux
(c) Lamp efficiency
(d) Brightness
Hint: 1 lux = 1 lumen per square meter (lm/m^2)

10. Lumen output of a LED lamp is approximately _____ lumens per watt
(a) 12
(b) 30
(c) 40
(d) 100*

11. Aluminium tapes are used while binding overhead LT conductors to the insulators, because it _____
(a) Gives better conductivity
(b) Protects from surge voltage
(c) Gives support against frictional damage*
(d) None of the above
Hint: Aluminium conductors are relatively soft and can wear or become damaged due to friction when bound directly to insulators or hardware. Wrapping aluminium tape around the conductor at the contact point provides a protective layer that absorbs friction and prevents abrasion, while also ensuring a secure and firm binding.

12. Shackle insulators are used in overhead lines of voltage up to ____
(a) 11 KV
(b) 33 KV
(c) 650 V*
(d) 66 KV
Hint:



13. The energy conservation day in India is ____
(a) 14th November
(b) 14 December*
(c) 22nd April
(d) 5th June

14. For unauthorized use of electricity, a consumer can be provisionally accessed electricity charges under _____ of Electricity Act 2003
(a) Section 135
(b) Section 126*
(c) Section 127
(d) Section 138
Hint:
Section 126 – Deals with assessment of charges for unauthorised use of electricity (civil liability).
Section 135 – Defines the offence of theft of electricity (criminal liability, requires dishonest intention).
Section 127 – Provides for appeal against the final assessment order made under Section 126.
Section 138 – Deals with interference with meters or works of the licensee (a separate offence)

15. The VA rating of instrument transformer _____
(a) is very large
(b) is very low
(c) is Zero
(d) Depends on its input current
Hint: Instrument transformers (both Current Transformers (CTs) and Potential Transformers (PTs)) are designed to measure or monitor high voltages and currents by stepping them down to safe, standard values for metering and protection relays. Their VA (volt-ampere) rating is very low compared to power transformers.

16. Unit of measurement of P.I. value is_____
(a) Ohms
(b) Mho
(c) Pure number
(d) None of the above
Hint: P.I. (Polarization Index) is the ratio of insulation resistance measured for 10 minutes to the insulation resistance measured for 1 minute.

17. The NABL accredited laboratory for testing of energy meters (watt hour meter) in Odisha is _____
(a) MRT Laboratory, BBSR of CESU
(b) MRT Laboratory, Burla of WESCO
(c) STL, BBSR under EIC (Electricity)*
(d) MRT laboratory, Balasore of NESCO

18. The resistance of a material of 2 m long and 2 m^2 in area of cross section is 1.6 x 10^{-8} Ohms. It's specific resistance will be _____
(a) 1.6 x 10^{-8} Ωm
(b) 6.4 x 10^{-8} Ωm
(c) 3.2 x 10^{-8} Ωms
(d) 0.16 x 10^{-8} Ωms
Hint: R = ρL/A

19. Two transformers operating in parallel will share the load depending upon their
(a) Ratings
(b) Leakage reactance
(c) Efficiency
(d) per unit impedance
Hint: When transformers operate in parallel, the load sharing between them is inversely proportional to their per-unit impedances. The transformer with the lower per-unit impedance will take a larger share of the load, provided their voltage ratios and phase sequence are the same.

20. What voltage drop will be there across a 1 KW electric heater, whose resistance when hot is 40 Ω.
(a) 100 V
(b) 50 V
(c) 150 V
(d) 200 V*
Hint: $P = V^2/R$
$\therefore V = \sqrt{PR} = \sqrt{(1000)(40)} = 200$ V

21. Five cells each of emf E and internal resistance r are connected in series, if due to oversight, one cell is connected wrongly, then equipment emf and internal resistance of the combination are _____
(a) 3E & 5r
(b) 5E & 5r
(c) 3E & 3r
(d) 5E & 4r
Hint: $E_{total} = 4E – E = 3 E$
Total resistance = 5r

22. One kilowatt hour is equal to _____
(a) 36 x 10^3 J
(b) 10^3 J
(c) 36 x 10^5 J
(d) 10^5 J

23. Electric supply is rated at 220 V. In a house, 11 bulbs of power rating 100 W each used The rating of the fuse should be _____
(a) 0.5 A
(b) 0.1 A
(c) 1 A
(d) 5 A*
Hint: I = P/V = (100 x 11)/220 = 5 A

24. A tap supplies water at 22°C. A man takes 1 litre of water per minute at 37°C from the geyser. The power of the geyser is _____
(a) 2100 W
(b) 1575 W
(c) 525 W
(d) 1050 W*
Hint: Q = mcΔT
= 1000 x 4.2 x (37 - 22)
= 63000 J
Power = Heat per second
= 63000/60 = 1050 W

25. A 300 KG PCC pole means
(a) The weight of the pole is 300 KG when dry
(b) The weight of the pole is 300 KG when weight
(c) It can take maximum 300 KG vertical load
(d) It can take maximum 300 KG transverse load*

26. The resistance of an ideal ammeter is
(a) Zero
(b) High
(c) Infinite
(d) 100 KΩ
Hint: An ideal ammeter is designed to measure the current flowing through a circuit. To do this without altering the circuit's behaviour, it must have zero resistance.

27. A voltmeter of resistance 998 Ω is connected across a cell of emf 2 V and internal resistance 2 Ω. The reading of the voltmeter will be
(a) 1.98 V
(b) 1.96 V
(c) 1.996 V
(d) 1 998 V

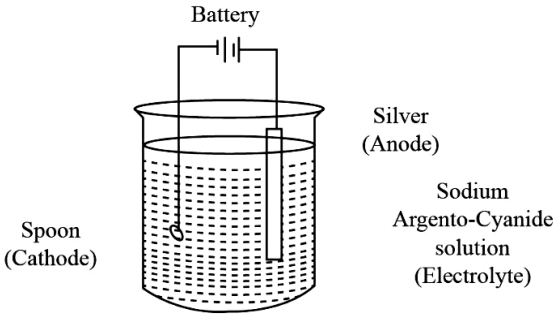
Hint: $I = \frac{E}{R+r} = \frac{2}{998+2} = 0.002\,A$
V (or E) = IR = 0.002 x 998 = 1.996 V

28. When a transformer primary is fed from AC, its core heats up due to _____
(a) Permeability of core
(b) Reluctance of core
(c) Ferro magnetism
(d) Hysteresis loss
Hint: When a transformer is fed with AC, the magnetic field in the core reverses direction repeatedly (many times per second). This repeated magnetization and demagnetization of the core material causes energy to be lost in the form of heat. This phenomenon is called hysteresis loss.

29. For the process of electrolysis, we require _____
(a) DC supply*
(b) AC supply
(c) Either AC or DC does not matter
(d) Both AC & DC supply

30. The most commonly used cell in control rooms is _____
(a) Lead-acid cell*
(b) Nickel-iron cell
(c) Nickel-Calcium cell
(d) Fuel Cell

31. ____ will work only on DC supply
(a) Electric lamp
(b) Refrigerator
(c) Heater
(d) Electroplating*
Hint:



Electroplating with silver

32. An electric bulb rated at 220 V, 50 Hz is connected to 220 V, 5 Hz AC source then the bulb
(a) Does not glow
(b) Fuses
(c) Glows continuously*
(d) Glows intermittently
Hint: At 5 Hz, the current reverses direction only 5 times per second (10 times per second it passes through zero).
The filament has thermal inertia — it cannot cool down appreciably in the short time between zero crossings (0.1 s).
So the filament temperature stays high, and the bulb glows continuously without visible flicker.

33. A 3-phase load is said to be balanced, if all the 3-phases have the same ____
(a) Impedance
(b) Power factor
(c) Impedance & power factor*
(d) None of the above

34. A water source has average discharge of Q m^3/sec, head H meters, density of water w kg/m^3. If gravity is g m/sec^2 and combines efficiency of turbine and generator to be g the power available for generation is
(a) wQHgη/75 kW*
(b) wQHη/10^{-3} kW
(c) wQHg kW
(d) QHgη KW

35. The best location of p.f. correction equipment to be installed on transmission line is at the ____
(a) Sending end
(b) Receiving end*
(c) Middle of line
(d) None of the above
Hint: Power factor correction equipment (such as shunt capacitors or synchronous condensers) is best installed at the receiving end of a transmission line because the receiving end typically has the lowest voltage (due to voltage drop along the line). Installing correction equipment there directly improves the voltage profile at the load end.

36. A string of suspension insulators has 3 discs. If the disc nearest to the conductor flashes over (i.e. breaks down), then ____
(a) The remaining discs will flash over*
(b) The remaining discs will remain intact
(c) Only the top disc will flash over
(d) None of the above

Hint: In a string of suspension insulators, the voltage across each disc is not equal — the disc nearest to the conductor experiences the highest voltage due to the shunt capacitance between each disc and the tower/earth.
When the disc nearest to the conductor flashes over (breaks down), it becomes short-circuited.
The full voltage that was previously shared among all discs now gets redistributed across the remaining discs.
The disc next to the failed one now experiences an even higher voltage than before, causing it to flash over as well.
This process *continues* in a cascade, and all the remaining discs flash over one after another.

37. If span length is doubled with no change in other factors, the sag of the line will become
(a) 0.5 times
(b) 2 times
(c) 8 times
(d) 4 times*
Hint: $S = wL^2/8T$
So $S \propto L^2$

38. In a circuit breaker, rating is 1500 A, 1000 MVA, 33 KV, 3 seconds, 3-phase. Then the MVA capacity is for _____
(a) Making capacity
(b) Breaking capacity*
(c) Both making & breaking capacity
(d) None of the above

39. Differential protection in principle is employed for _____
(a) Protection of alternators
(b) Protection of transformers
(c) Bus-zone protection
(d) All of the above*
Hint: Differential protection is a very effective and widely used protection scheme based on Kirchhoff's current law — it compares the currents entering and leaving the protected zone.

40. The impedance relaying scheme is used for the protection of _____
(a) Transmission lines*
(b) Alternators
(c) Bus bars
(d) Transformers
Hint: Impedance (distance) relays measure the impedance (or distance) from the relay location to the fault point.
If the measured impedance is less than the set value (i.e., fault is within the protected zone), the relay operates.

41. Full load slip of a synchronous motor is _____
(a) 5%
(b) 1%
(c) 2%
(d) Zero
Hint: $S = (N_s - N_r)/N_s$
For a synchronous motor, $N_s = N_r$
$\therefore s = 0$

42. The EMF induced in _____ is a statically induced EMF.
(a) DC generator
(b) DC motor
(c) Transformer*
(d) None of the above
Hint: In transformer, both primary and secondary windings are stationary, and EMF is induced due to mutual induction (changing flux linking the stationary coils). This is statically induced EMF.

43. The full load copper-loss and iron-loss of a transformer are 6400 W and 5000 W respectively. The copper-loss and iron-loss at half load will be respectively
(a) 3200 W and 2500 W
(b) 3200 W and 5200 W
(c) 1600 W and 1250 W
(d) 1600 W and 5000 W*
Hint: $P_{Cu,fraction} = P_{Cu,full}$ (Load fraction)^2
$P_{Cu,half} = 6400 \times (1/2)^2 = 1600$ W
Iron loss will remain unchanged.
$P_{i,half} = P_{i,full} = 5000$ W

44. A 250 KVA, 11000 V/ 400 V and 50 Hz single phase transformer has 80 turns on the secondary, what is the maximum value of flux?
(a) 2475 mWb
(b) 0.2 mWb
(c) 22.5 mWb*
(d) 55.2 mWb
Hint: $V = 4.44fN\phi_m$

$$\phi_m = \frac{400}{4.44x50x80} = 22.5mWb$$

45. For a current upto 10A which material is used as the fusing element?

(a) Copper
(b) Silver
(c) Alloy of lead and tin*
(d) Zinc
Hint: **Lead-tin alloy** has a low melting point, which allows it to melt quickly and interrupt the circuit at lower currents without excessive heating.
For higher currents (above 10 A), materials like copper, silver, or zinc are used because they have higher melting points and better conductivity.

46. A distribution transformer usually is a
(a) Star-star transformers
(b) Delta-delta transformer
(c) Star-delta transformer
(d) Delta- star transformer*

47. The breakdown stress of atmospheric air is approximately
(a) 0.3 kV/cm
(b) 3 kV/cm
(c) 30 kV/cm*
(d) 300 kV/cm

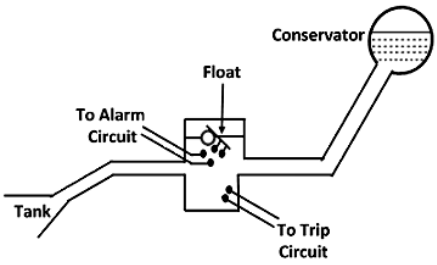
48. If the fault current is 2000 amps, the relay setting 50 % and the C.T. ratio is 400/5, then the plug setting multiplier will be
(a) 5
(b) 7
(c) 8
(d) 10
Hint: CT ratio = 400/5 means:
400 A primary → 5 A secondary.
So secondary fault current:
=2000 x (5/400) = 25 A
Relay setting = 50% of 5 A = 2.5 A
Plug Setting Multiplier (PSM)
= Secondary fault current/relay pickup current
= 25/2.5 =10

49. A 3-phase breaker is rated at 2000 MVA, 33 kV; its making current will be
(a) 35 kA
(b) 49 kA
(c) 70 kA
(d) 89 kA*
Hint: Rated current
$I = P/(\sqrt{3} \times V)$
$= 2000 \times 10^6/\sqrt{3} \times 33 \times 10^3$
= 35000 A = 35 kA
Making current = 2.55 x rated current
= 2.55 x 35 kA = 89 kA

50. The order of the lightning discharge current is
(a) 10,000 amp*
(b) 100 amp
(c) 1 amp
(b) 1 microampere

51. Internal faults of transformer are detected and protected by
(a) Buchholz relay*
(b) Directional relay
(c) Thermal relay
(d) Distance relay
Hint: Buchholz relay is used for the protection of oil-immersed transformers against internal faults such as:

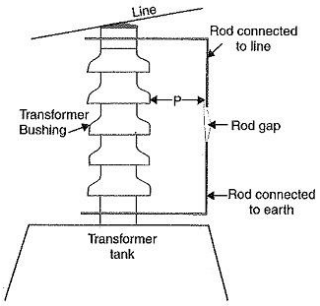
- Winding short circuits
- Core faults
- Insulation failure
- Incipient faults (slow-developing faults that produce gas)



Arrangement of Buchholz Relay

52. An isolator operates under
(a) Fault condition
(b) No load condition*
(c) Full load condition
(d) 50 % load condition
Hint: An isolator (also called a disconnecting switch) is designed to operate only when there is no current flowing in the circuit, i.e., under no load condition.

53. The lightning arrester is usually connected
(a) In series with the line
(b) Between line and earth*
(c) Both (a) and (b)
(d) Neither (a) nor (b)
Hint:



54. Authorization of charted Electric safety Engineer to assist the owner of supplier or consumer of electric installations for the purpose of self-certification under regulation 30 and regulation 43 is in accordance with CEA (Measures relating to safety and Electric Supply), regulation, 2010.
(a) Regulation 5A*
(b) Regulation 8
(c) Regulation 16
(d) Regulation 28

55. The minimum clearance above ground of the lowest conductor of overhead lines of voltage 33 kV erected above the agricultural land shall be _____ meters as per CEA (Measures relating to safety and Electric Supply), regulation, 2010.
(a) 5.2
(b) 5.8
(c) 5.5*
(d) 4.6

56. As per CEA (Technical standards for Connectivity to Grid) Regulations, 2007; the voltage unbalance at 33 kV and above shall not exceed.
(a) 3%*
(b) 8%
(c) 5%
(d) 4%

57. An 11 kV overhead line passes adjacent to building having open balcony. The horizontal safety clearance for the overhead line from the balcony wall be at least _____ meters as per CEA (Measures relating to safety and Electric Supply), regulation, 2010.
(a) 1.2*
(b) 4.6
(c) 2.5
(d) 3.7

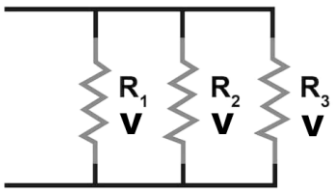
58. An 11 kV overhead line passes over a building having flat roof. The vertical safety clearance for overhead line above highest part of building immediately under the line shall be at least _____ meters as per CEA (Measures relating to safety and Electric Supply), regulation, 2010.
(a) 3.7*
(b) 4.6
(c) 2.5
(d) 1.2

59. An 11 kV overhead line crosses a medium voltage overhead line. The minimum clearance between these lines shall be _____ meters as per CEA (Measures relating to safety Electric Supply), regulation, 2010.
(a) 2.44*
(b) 3.50
(c) 4.58
(d) 3.05

60. In general, the surge arresters are made up of
(a) ZnO*
(b) Zn
(c) Pd
(d) Zr
Hint: Zinc Oxide (ZnO) is the primary material used in surge arresters due to its excellent non-linear voltage-current characteristics.
Under normal operating voltage, ZnO behaves as an insulator (very high resistance).
Under high-voltage surges (lightning or switching), it becomes conducting (low resistance) and diverts the surge current to earth.

61. The phase current of a delta-connected, 3-phase circuit is 100 amps. The line current will be ____
(a) 57.8 amps
(b) 100 amps
(c) 173 amps
(d) 300 amps
Hint: Line current = $\sqrt{3}$ x phase current

62. The voltage across any branch of parallel circuits is
(a) Determined by the resistance of the branch
(b) Equal to the supply voltage*
(c) Determined by sum of number of loads
(d) Determined by product of number of loads
Hint:



63. An electrical circuit that has infinity resistance is called as ____ circuit.
(a) An open*
(b) A short
(c) A ground
(d) Either b or c
Hint:
Circuit Type → Resistance → Current Flow
Open circuit → Infinite (∞) → Zero
Short circuit → Zero (0) → Very high

64. If the diameter of a metal wire of a given length is halved, its resistance will
(a) Be four times*
(b) Be halved
(c) Remain the same
(d) Be 1/4th time
Hint: $R = \rho L/A$
We know, $A = \pi d^2/4$
$\therefore R \propto 1/d^2$

$$\frac{R_{new}}{R_{old}} = \left(\frac{d_{old}}{d_{new}}\right)^2$$

$$\frac{R_{new}}{R_{old}} = \left(\frac{d}{d/2}\right)^2 = 4$$

$R_{new} = 4\ R_{old}$

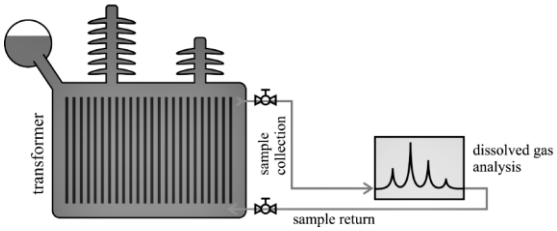
65. How much is the nominal output voltage of a Lead Acid cell?
(a) 1.2 V
(b) 1.5 V
(c) 2.0 V*
(d) 2.2 V

66. The maximum permissible watts in a heating sub-circuit as per ISI code is ____
(a) 100 watts
(b) 800 watts*
(c) 1 kW
(d) 1.5 kW
Hint: According to the relevant Indian Standard (IS 732, Code of Practice for Electrical Wiring Installations), the maximum permissible load for a heating sub-circuit is typically limited to 800 watts.

67. Two 120 V light bulbs are connected in series across a 240 V line. Light bulb L_1 is 60 watts and L_2 Is 100 W. How will the bulbs glow?
(a) Both L_1 & L_2 will glow with equal brightness.
(b) Bulb L_2 will glow brighter than bulb L_1
(c) Bulb L_1 will glow brighter than bulb L_2*
(d) Both bulbs will not glow.
Hint: Brightness depends on the actual heat dissipated (I^2R) by each bulb when connected in the circuit.
$R_1 = V_1^2/P = 120^2/60 = 240\ \Omega$
$R_2 = 120^2/100 = 144\ \Omega$
$Heat_1 = I^2R_1 = 240I^2$
$Heat_2 = 144I^2$
Here, current is same in both cases being in series.
We see that $Heat_1 > Heat_2$
Hence, L_1 will glow more.

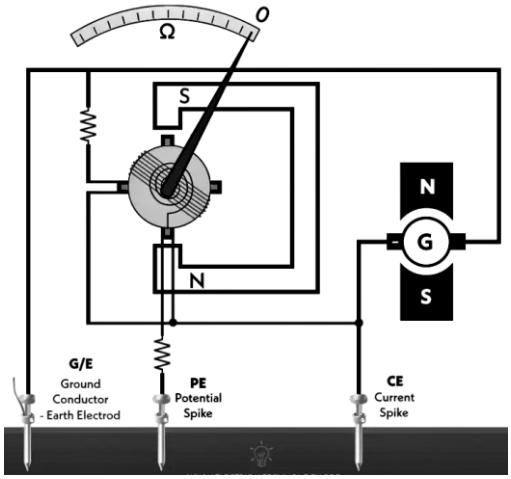
68. AC magnets are made of laminated iron.
(a) For better induction
(b) To reduce the heating effect*
(c) For AC and DC use
(d) To prevent chattering
Hint: When an AC electromagnet is used, the alternating magnetic flux induces eddy currents inside the iron core. These eddy currents circulate within the core and cause significant heating (eddy current loss), which wastes energy and can damage the insulation. To minimize these eddy currents, the core is made of laminated iron — thin sheets of iron stacked together and insulated from each other. This increases the resistance to the flow of eddy currents, thereby reducing heating.

69. DGA test of transformer oil is a diagnostic test which indicates the
(a) Condition of the transformer oil
(b) Healthiness of transformer winding and insulation*
(c) Healthiness of transformer external parts
(d) None of this
Hint: DGA (Dissolved Gas Analysis) is a diagnostic test performed on transformer oil. When faults occur inside a transformer — such as overheating, arcing, or partial discharge — the insulating oil and paper insulation decompose and generate characteristic gases (like hydrogen, methane, acetylene, ethylene, etc.) that dissolve in the oil.



DGA primarily indicates the healthiness of the transformer winding and insulation, not just the condition of the oil itself.

70. The earth tester uses
(a) AC
(b) DC*
(c) AC or DC
(d) None of this
Hint: An earth tester (also called a ground resistance tester) works by supplying a DC current (or a periodically reversing DC) into the ground through the earth electrode and measuring the voltage drop to calculate the earth resistance.



71. Transformer oil used in transformer provides
(a) Insulating and cooling*
(b) Cooling and lubrication
(c) Lubrication and insulation
(d) Insulation, cooling and lubrication

72. A tap changer is used on a transformer for
(a) Adjustments in primary voltage
(b) Adjustments in secondary voltage
(c) Adjustments in both primary and secondary voltages
(d) Adjustment in power factor
Hint: A tap changer is used on a transformer to adjust the number of turns in the winding, thereby changing the turns ratio and hence the secondary voltage.

73. Polarization Index is the ratio of insulation resistance measured values of duration
(a) R_{600s}/R_{60s}*
(b) R_{60s}/R_{15s}
(c) R_{100s}/R_{10s}
(d) None of the this

74. The efficiency of transformer compared with that of electric motors of the same rating is
(a) About the same
(b) Much smaller
(c) Slightly higher
(d) Much higher
Hint: A transformer is a static device — it has no moving parts, so there are no mechanical losses (like friction and windage) and no rotor copper losses.
An electric motor of the same rating has additional losses: Mechanical losses (friction, windage), Rotor copper losses and Stray load losses.
Because of this, the efficiency of a transformer is typically 95–99%, while electric motors of the same rating typically have efficiency of 80–95%.

75. The minimum dielectric strength BDV of transformer oil is required for a 33 kV/11 kV transformer is
(a) 60 kV
(b) 50 kV
(c) 40 kV*
(d) 30 kV

76. For conventional power plants, running cost is maximum for
(a) Thermal plant
(b) Hydro plant
(c) Diesel plant*
(d) None of this
Hint: The running cost (operating cost) of a power plant mainly includes the cost of fuel and maintenance.
Running cost: Diesel > Thermal > Hydro

77. Photo-voltaic cell produces electric energy from
(a) Electromagnetic energy*
(b) Electrostatic energy
(d) Both (a) and (b) above
(c) Geothermal energy

Hint: A photovoltaic (PV) cell converts light energy (which is a form of electromagnetic radiation) directly into electrical energy through the photovoltaic effect.

78. ____ meters will be most sensitive.
(a) 50 mA
(b) 100 µA
(d) 1 µA*
(c) 50 µA
Hint: The sensitivity of a meter refers to the smallest current that can cause a measurable deflection. A meter with a lower full-scale current is more sensitive.

79. In thermal power station, the largest capacity pump is
(a) Cooling water pump*
(b) Boiler feed pump
(c) None of this
(d) Condensate extraction pump
Hint: In a thermal power station, the cooling water pump (also called the circulating water pump) handles the largest volume of water. Its purpose is to supply a huge quantity of cooling water to the condenser to condense the exhaust steam from the turbine.

80. Load factor is defined as
(a) Maximum demand / Average demand
(b) Average demand / Maximum demand*
(c) Maximum demand / Peak load
(d) Maximum demand / Minimum demand

81. An AC circuit has a 100 ohms R, a 100 ohms X_L, 100 ohms X_C. all in series. The impedance Z of the series combination is equal to ____
(a) 33.33 ohms
(b) 70 ohms
(c) 100 ohms*
(d) 300 ohms
Hint: $Z = \sqrt{R^2 + (X_L - X_C)^2}$
$= \sqrt{100^2 + (100-100)^2}$
= 100 ohms

82. Guy is fastened to a pole to
(a) Strengthen the pole*
(b) Hold telephone cables
(c) Keep the wires from sagging
(d) None of these

83. Sag template is required for finding
(a) The position and height of the supports on the profile*
(b) Tension in the conductor
(c) Calculate sag of the span
(d) None of this

84. If the power factor of a circuit is unity, its active power is.
(a) Zero
(b) Unity
(c) Maximum*
(d) Minimum
Hint: P =VIcosϕ
When power factor is unity (cosϕ = 1), the active power becomes:
P = VI × 1 = VI
This is the maximum value of active power for a given voltage and current.

85. The conductor carries current on the surface in comparison to its core. The phenomenon is called the
(a) Skin effect*
(b) Corona
(c) Ferranti effect
(d) Lenz's effect
Hint: Skin effect is the phenomenon in which alternating current (AC) tends to concentrate near the surface of a conductor rather than flowing uniformly through its cross-section. As a result, the current density is highest at the surface and decreases toward the core.

86. In 3 phase power measurement by two wattmeter method, when both watt meters read same value. The power factor is
(a) Unity*
(b) 0.5 to unity
(c) 0.5
(d) Below 0.5
Hint: $\tan\phi = \sqrt{3}\left(\frac{W_1 - W_2}{W_1 + W_2}\right)$
Given $W_1 = W_2$
∴ tanϕ = 0 ⇒ cosϕ = 1
So the power factor is unity.

87. If the supply voltage V is 10 volts across the inductive coil and a resister connected in series , when voltage across the inductive coil (V_L) is 8 volts, the amount of voltage read by the volt meter across the resister (V_R) is ____
(a) 2 volts
(b) 6 volts*
(c) 10 volts

(d) 18 volts

Hint: $V = \sqrt{V_R{}^2 + V_L{}^2}$

$10 = \sqrt{V_R{}^2 + 8^2}$

$\therefore V_R = 6$ V

88. If the supply frequency changes from 50 Hz to 100 Hz. Keeping voltage constant, the inductive reactance of coil connected to supply ____

(a) Remains same
(b) Become half
(c) Become doubled*
(d) Become 4 times.

Hint: $X_L = 2\pi fL$

$\Rightarrow X_L \propto f$

$$\frac{X_1}{X_2} = \frac{f_1}{f_2} = \frac{50}{100} = \frac{1}{2}$$

89. Lightening arrestors are provided In sub-station at
(a) Line incoming & outgoing points*
(b) Near to circuit breaker
(c) Near to CTs
(d) None of this

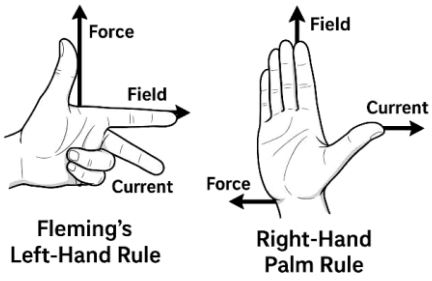
90. Safe value of current carrying capacity of cables is determined by
(a) Maximum voltage
(b) Maximum temperature*
(c) Power factor
(d) Maximum pressure

91. The power factor of an induction motor operating at no load will have value around
(a) 0.9 lag
(b) 0.2 lead
(c) 0.2 lag*
(d) 0.9 lead

92. The body resistance value of a person with normal age and health is about ____
(a) 1000 ohm*
(b) 10 kilo ohm
(c) 5 kilo ohm
(d) 0.5 kilo ohm

93. Fleming's right hand rule is applicable for
(a) Generator*
(b) Motors
(c) Both generator and motors
(d) None of this

Hint:



94. AAAC stands for
(a) All Aluminium alloy conductor*
(b) All Aluminium conductor
(c) Alloy Aluminium conductor
(d) None of this

95. When five resistors are connected in parallel of values 10 K ohms, 100 K ohms, 1 K ohm, 1.0 ohm and 0.1 ohm, the equivalent resistance value will be always less than
(a) 1.0 ohm
(b) 100 K ohms
(c) 1 K ohm
(d) 0.1 ohm

Hint: $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4} + \frac{1}{R_5}$

A key rule for parallel resistors:
The equivalent resistance is always less than the smallest individual resistance.
Here, the smallest resistance among the given values is: 0.1 Ω
So the equivalent resistance will be less than 0.1 ohm.

96. Fusing factor value is always
(a) Less than one
(b) More than one*
(c) More than two
(d) None of this

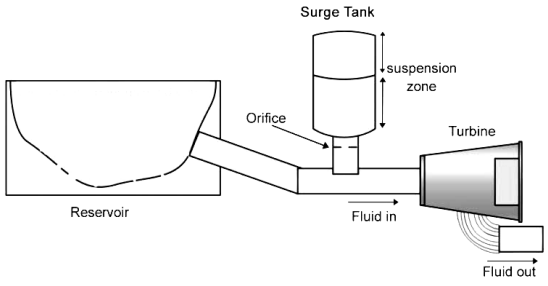
Hint: Fusing factor is defined as the ratio of the minimum fusing current to the rated current of the fuse.
Since the fuse must carry its rated current continuously without melting, the minimum fusing current must be greater than the rated current. Therefore:
Fusing Factor>1
Typically, the fusing factor is around 1.5 to 2.0 for common fuse types.

97. Voltage regulation of a transformer is the
(a) voltage drop from no load to full load*
(b) Current rise from no load to full load

(c) Power loss from no load to full load
(d) None of this
Hint: Voltage regulation of a transformer is defined as the change in secondary terminal voltage from no load to full load, expressed as a percentage (or per unit) of the rated secondary voltage, with the primary voltage held constant.

98. How to get (-)2 volt from a battery
(a) By connecting the (-)ve terminal of the battery to earth
(b) By connecting (+)ve terminal of the battery to earth*
(c) By reverse connecting two batteries
(d) None of this
Hint: To get −2 V from a battery, you need to establish a reference point (ground/earth) such that the battery terminal you measure relative to ground gives a negative potential.
If you take a 2 V battery and connect its positive (+) terminal to earth (ground), then:
The positive terminal is at 0 V (ground potential).
The negative (−) terminal is at −2 V relative to ground.
So measuring the negative terminal with respect to earth/ground gives:
V = −2 V

99. In a Hydro Station Surge tank is provided near to the
(b) Tailrace
(a) Turbine*
(c) Reservoir
(d) None of this
Hint:



100. By adding more resistance to RL circuit, the ____
(a) True power decreases*
(b) Power factor decreases
(d) None of this
(c) Angle of phase difference
Hint: