

ELECTRICAL QUIZ. 1

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1. What will happen if neutral connection cut?

If neutral is cut with 3 phases energized, then line voltage will appear in single phase supply points, that is 400 V in 230 V equipment and will fail if started.

2. Why radial distribution is supposed to have transformer delta - wye to the downstream level?

This is to break the Zero sequence path at each transformer secondary voltage level and enable individual system grounding on each transformer secondary.

3. What is the main difference between Dyn11 & Dyn1?

The phase shift of secondary voltage with respect to primary is +30 deg.(Lead) & -30 deg.(Lag) respectively.

4. Why CT/PT secondaries are earthed at one point?

To prevent Capacitance Coupling between primary & Secondary, which could result in the secondary winding floating at up to the primary voltage to ground. Double earthing causes circulating current resulting in maloperation of the concerned relay.

5. Why low PF starting in domestic air conditioning?

Mostly, Split phase IMs are used in residential ACs which don't use starting capacitors & hence lower pf of 0.2 to 0.3 range.

6. What is the normal operating temperature of batteries?

25 deg.C. 9 deg. C raise in temp will halve its life.

7. How to find current of 415 V transformers/motors?

Multiply KVA/HP by 1.39 to get its load current in Amps.

8. What is Ferro resonance?

A phenomenon of over voltage and very irregular wave shape

associated with the excitation of saturable reactors in series capacitors in power systems mainly during single phase cut conditions in a 3 phase system.

9. Which reactance shall be used for short circuit calculation of generators?

X_d'' : Direct Axis Subtransient Reactance (Saturated at rated voltage) is used for short circuit calculations which flows during first few cycles of the fault. The fault current in two phase fault conditions shall be used for Relay settings and coordination.

Eg: X_d'' for 6 MW GEN: 0.2.

10. Which value shall be used for transformer inrush current, s/c calculation?

The base value of ONAN rating of the transformer shall be used.

11. What are the types of earthing system?

IT, TT, TN (TN-C, TN-S, TN-C-S). TN-C-S is mostly used in our systems, the neutral is separated from the earth only at the service entrance panel & down stream of the distribution.

12. How much power for rotor of a generator is required?

Generally, 0.25% of generator rated power.

Eg: 0.5 MW for a 200 MW GENERATOR.

13. Where 400 Hz used?

Air crafts, Submarines, Military Applications due to light weight and high speed.

14. What are the effects of short circuit currents?

Thermal effects, Dynamic forces, System Stability.

15. How a lightning surge current is indicated?

Primary lightning surge: 10/350 μ s.

Secondary lightning surge: 8/20 μ s.

First number : Time taken to reach peak value.

Second number : Time taken to drop to 50% peak current.

16. Which is the optimal site test for transformer commissioning apart

from LV tests?

HV Tan delta (Dissipation factor) test at 10 KV.

Also, excitation current test with tan delta test kit.

17. What is the minimum clearance for a 110 KV OH Lines over a terrace?

15 feet over a terrace.

6.7 to 7.6 metres from ground.

18. How to calculate S/C current of a generator?

S/C current is full load current of the generator divided by subtransient reactance of generator(X_d'').

Typical value:0.15 unlinked with the size of generator.

19.Which value is being set for instantaneous over current protection?

For assymetrical fault current which will be about 1.8 times the symmetrical fault current.

20. Which is enemy for a flow of electron ?

HEAT.

21. Which parameter of an electrical equipment determines its Short Circuit Capacity (SCC) ?

Its impedance.

22. What you mean by synchronization?

Matching the sine waves of two different sources.

23. What is the operating temperature for OH lines?

75 deg. C with 25deg. C ambient, well below the annealing temp(93 deg. C) of aluminium.

24.What are the main conditions for paralleling transformers?

Same polarity, phase shift & impedance.

Delta primary will introduce 30 deg. phase shift.

The difference of % Z shall be less than 10 %.Eg:(10-9)/9 =11.1%, not ok.

25. What is amortissure winding?

A winding on the rotor shorted at both ends to dampen the waveform distortion during load changes.

26. How to measure soil resistivity?

Wenner's 4 point method. By injecting ac current in between two probes and measuring the voltage in between two probes in perpendicular samples.

27. What is K rated transformers?

Derating factor of transformer due to harmonics.

28. What is Clophen?

It is a PCB used in transformer for insulation and cooling.

29. What is droop control of generator?

Decrease or increase in governor setting of the generator as the frequency decrease or increase. Normally it is about 4 to 5 %.

All generators in parallel must be set the same setting.

1 % of speed change varies 25 % of its output.

30. What's the convention of current flow direction?

Franklin convention of direction. That is, current flow is from +ve to --ve whereas the flow of electrons is from --ve to +ve.

31. What are holes ?

Holes are positively charged atoms. Hole current is not the same as electron current & its mobility is less than 50% of normal current & it is only through semiconductor.

32. Transformer charging without load or with minimum load.

Which is better?

As L/R time constant only decides DC decaying duration, it is better to charge the transformer with minimum load.

33. Why capacitor block DC but conducts AC?

As DC is unidirectional, the capacitor gets charged in the initial giving of supply and no more change & hence blocked. Whereas, as AC is of alternating its polarity for 50 times per second, the capacitor gets

charged and discharged accordingly, thus conducting AC through it.

34. What is power factor?

The ratio of real power to apparent power is power factor of the system. If the peaks and troughs of voltage & current waves occur at the same time it is UPF.

35. What are 8 basic laws of Electrical Engineering?

- (i) Ohm's Law.
- (ii) Law of Resistance.
- (iii) Joule's Law of Heating.
- (iv) Fleming's right-hand rule.
- (v) Fleming's Left Hand Rule.
- (vi) Faraday's Law.
- (vii) Lenz's Law.
- (viii) Kirchhoff's current & Voltage law.

37. What is KW?

KW is kilo Joules/sec
& MW is mega Joules/sec.

38. Define DYn11 transformer vector group.

Indicates transformer primary & secondary winding connections. LV Voltage & Current always lead HV side Voltage & Current by 30 degs. Phase markings clockwise & phase rotation in anti clockwise.

39. What are the type of batteries?

Lead -Acid.
Lithium --Ion.
Nickel-Cadmium.
These batteries are rechargeable.
Aluminium-Air batteries are non rechargeable batteries.

40. Who used the word electric first?

William Gilbert (1544-1603)

41. What is Bio Electricity?

Our body controls, signalling, heart operation, brain function etc. are done through the electricity produced in our body. This is Bio electricity.

42. What are the inter state transmission charges in India?

The inter state transmission charges consists of injection point charges (UP:10 Paise) and withdrawal point charges (TN:13 Paise) based on PoC tariff and the transmission loss for both injecting and with drawing entity.

Eg:NR:1.40 % & SR High category :2.31% (Varies for quarter)

43.Enumerate about DGA.

High CO,CO₂: Thermal over heating.

High Acetylene(C₂H₂): Arcing.

H₂:Less than 500 PPM is normal.

ROGERS Ratio of CH₄/H₂:0.1 TO 1.0.

The more important factor of DGA gases is not only the ppm, mainly, the trending whether upward or downward. Total gas content shall be about within 15%. C₂H₆:Ethane.

Gas Ratios:Roger,IEC,DOREMBERG,DUVEL.

CO₂/CO:25-OK.

Other Tests:

Dielectric oil test,

Moisture content,

Karl Fisscher,

Oxidation Inhibitor,

Power factor.

H₂ high content alone will not indicate any fault but only combined with other gases.

44. What is Corona?

When there is high enough potential (more than 14 kv/cm) to ionise the air around a live conductor, Corona discharge occurs, ozone & nitrates are formed which damage the insulation.

45. Which is the best relay for generator protection?

High Impedance differential relay that is biased differently as the settings keep on increasing with fault current.

46.Why transformers fire and burst?

Mainly due to tank rupture which enables air entry into the tank for fire initiation, fire occurs in transformer when its oil loses its dielectric strength.

Also,

(i) Low oil level.

(ii) Voltage surges.

(iii) Presence of appreciable quantum of combustible gases viz, Hydrogen, Methane, Ethane, Methylene, Acetylene, Ageing, Insulation failures.

[47. Is](#) the earthing of Surge Arrester(SA) to be combined with system earthing?

Yes, To have equal relative potential at all points of the [facility. It](#) also depends on the relative distance of SA & system grounding.

48. What is wave of AC Voltage and current waves?

Mono chromatic Transverse Sinusoidal Electro Magnetic (MTSEM) Wave.

49. State typical X/R ratio for 110 kV & 230 kV equipment?

3.4 & 7.36 respectively.

50. What are the factors that decide voltage regulation?

Load & PF, Resistance & Reactance.