

ELECTRICAL POWER TRANSMISSION
AND
DISTRIBUTION

BRANCH: EE/EEE

SEM: 5TH

MODULE: III

Short Question

① what are the various cause of failure of insulator.

Ans:- The following are the cause of failure of insulator.

- (i) mechanical stresses
- (ii) flash over.
- (iii) Porosity of material.
- (iv) Cracking of insulator.

② what are the various test of insulators.

The test of insulators are

- (i) mechanical test
- (ii) Electrical insulation test.
- (iii) Temporary cycle.
- (iv) environmental tests.

③ what are the types of suspension insulators.

ans the type of suspension insulators are

- (i) Core and line type.
- (ii) Cemented cap type
- (iii) Helix or interlinking type.

Qy where did the stream insulator are used.

Qns:- These insulators are used in dead end towers or bends or corners of Transmission line or when making very long span.

Q5 Name atleast 4 insulating material for O.H line.

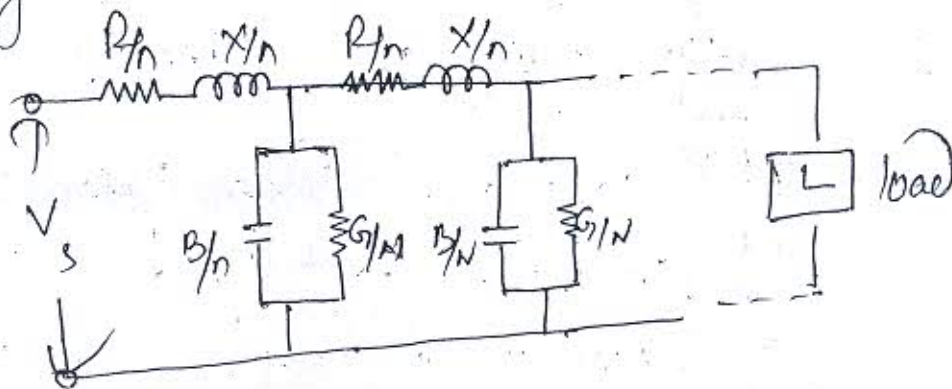
ans The main 4 materials for o/h lines are

- (i) Porcelain
- (ii) glass
- (iii) Steatite.
- (iv) Synthetic resin.

Q6 How constant voltage transmission will be maintained along the line.

ans Constant voltage in the transmission line will be maintained by installing designed synchronous motor at the receiving end.

Q7 Draw the equivalent circuit of a long transmission line of n -section.



Q8) what are the effect of Power factor on transmission efficiency.

Ans

The power delivered to the load

$$P = V_R \cdot I \cdot \cos\phi_R$$

$$\Rightarrow I = \frac{P}{V_R \cdot \cos\phi_R}$$

It is clear that for a given amount of power to be transmitted and V_R , the load current is inversely proportional to the load P.f ($\cos\phi_R$). Consequently if the load decrease, the load current and line losses increase. Thus the transmission η will decrease vice versa.

Q9) what are the effect of power factor on regulation.

$$\text{as } V.R = \frac{I R \cos\phi_R + I X_L \sin\phi_R}{V_R}$$

(i) If P.f is unity or lagging then

$$I R \cos\phi_R > I X_L \sin\phi_R$$

$\Rightarrow V_R$ is +ve.

(ii) But if P.f is leading, then

$$I R \cos\phi_R < I X_L \sin\phi_R$$

$\Rightarrow V_R$ is -ve

(iii) for a given V_R and I , the V.R of transmission line decrease of P.f for leading load.

10 what is flash over voltage for an insulator.

ans It is the voltage at which the arc discharge between conductor and insulator pin (i.e. ear) and the discharge jump across the air gap following shortest distance.

11 write two advantage of suspension type insulator over pin type insulator.

ans (i) Depending upon the working voltage the numbers of disc can be adjusted and each disc is suited for the system voltage of 11 kv.

(ii) If any one of the disc is damaged then the whole string is not affect. But if one pin insulator is damaged the the supply system will hamper.

12 what is string efficiency?

ans The ratio of voltage across the whole string to the product of numbers of disc and voltage across the disc nearest to the conductor.

$$\text{String efficiency} = \frac{\text{Voltage across the string}}{n \times \text{voltage across the disc nearest to conductor.}}$$

Q3) what is % voltage regulation of a transmission line.

ans) The difference in voltage at the receiving end of transmission line between condition of no load and full load is called voltage regulation and is expressed as a percentage of receiving end voltage.

$$\% VR = \frac{V_S - V_R}{V_R} \times 100$$

Q4) what is safety factor of insulator.

ans) The ratio of puncture strength to flash over voltage is known as safety factor.

$$\text{Safety factor} = \frac{\text{Puncture strength}}{\text{Flash over voltage}}$$

Q5) why capacitor banks are connected at receiving end of voltage transmission.

ans) The capacitor bank are connected at receiving end of voltage transmission because all the loads are remaining in the receiving end side and the power factor of these loads are to be improved if necessary by these capacitor bank.

16) List the main components of HVDC system.

ans the main components of HVDC system are (i) converters (ii) Converter transformers (iii) Smoothing reactor (iv) overhead line (v) reactive power source (vi) Earth electrode

17) what are the different types of D.C. lines

ans DC lines are three types

(i) monopolar

(ii) bipolar

(iii) homopolar.

18) How string efficiency can be improved?

String efficiency can be improved by using

(i) longer cross arm.

(ii) By grading the insulators.

(iii) by using a guard ring.

19) How transmission lines are classified?

ans Transmission lines are classified as

(i) short transmission line.

(ii) medium transmission line.

(iii) Long transmission.

20) Prove for a short transmission line

$$AD - BC = 1$$

Module - III

Q-21) What are the types of conductors used in overhead lines?

ans:- The most commonly used conductor material for overhead lines are copper, aluminium, steel-cored aluminium, galvanised steel and cadmium copper.

Q-22) What are the advantages that aluminium is considered over copper?

- ans:-
- (i) aluminium conductor is light.
 - (ii) low cost
 - (iii) cheap and used widely.

Q-23) Why ACSR conductors are preferred in transmission line.

ans:- (1) ACSR conductors are widely used for following reason.

- (1) ACSR conductors will produce smaller sag and hence longer span is used.
- (2) Due to smaller sag towers of small height can be used.

Q-24) What do you mean by sag in overhead transmission line.

ans: The difference in level between point of support and lowest point on the conductor is called sag.

Sag for equal level support

$$S = \frac{wl^2}{8T}$$

Sag for unequal level support

$$S_1 = \frac{wx_1^2}{2T}, \quad S_2 = \frac{wx_2^2}{2T}$$

25. What are the various supports in electrical transmission and distribution line.

Ans. The various supports in electrical transmission and distribution line are

- (i) wooden pole.
- (ii) steel pole
- (iii) RCC pole.
- (iv) steel towers.

26. What are the various factors affecting sag

Ans. The various factors affecting sags are

- (i) Atmosphere.
- (ii) Conductor size.
- (iii) Spacing between conductors.
- (iv) line voltage.

27. What is stringing chart and how it is useful.

ans. This is a chart which is being plotted between sag-temperature and tension-temperature for a given conductor and loading condition.

