SLR-EP – 509

Seat No.	

Set P

B.E. (Electrical) (Part – I) Examination, 2016
Elective – I : EXTRA HIGH VOLTAGE AC TRANSMISSION

Day and Date : Tuesday, 6-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) A sphere-sphere gap is used in HV laboratories for
   a) Measurement of EHV
   b) Calibrating other measuring apparatus
   c) Both a and b
   d) None of these

2) The type of EHV cable is
   a) High pressure oil filled
   b) Cross linked polyethylene
   c) Gas insulated lines
   d) All of the above

3) For reducing tower footing resistance it is better to use
   a) Chemical and ground only
   b) Chemical and counter poise only
   c) Ground rod and counter poise only
   d) Chemical ground rod and counter poise only

4) By increasing transmission line voltage to double of its original value the same power can be despatched keeping the line loss
   a) Equal to original value
   b) Half of original value
   c) One fourth or original value
   d) Double the original value

5) The allowable noise level at one MHz is
   a) 22 dB b) 26 dB c) 30 dB d) 32 dB

6) The conductivity of moist is of magnitude
   a) 10^{-1} mho/metre b) 10^{0} mho/metre c) 10^{-2} mho/metre d) 10^{-3} mho/metre

7) Third mode of propagation is called as
   a) Line to ground b) Phase to phase c) Homopolar d) Inter-phase

8) Operating 750 KV line gives AN at a level of
   a) 50 dB b) 55.4 dB c) 52 dB d) 58.5 dB

9) In general method of Laplace transform the series and shunt impedance operator per unit length of line is
   a) z (s) = r + l (s)
   b) y (s) = g + c (s)
   c) both a) and b)
   d) none of the above

P.T.O.

10) For Aeolian vibration the frequency of vibration is usually limited to _____ Hz and the amplitudes less than _____ cm.
a) 20 Hz, 2.5 cm b) 25 Hz, 2.5 cm c) 50 Hz, 2.5 cm d) 50 Hz, 3.5 cm

11) Reflection coefficient of voltage (K_r) for open circuit is
a) 0 b) + 2 c) + 1 d) – 1

12) The dimensions of constants B and C are respectively _____ and _____
a) Ohm, Siemen b) Mho, Siemen
c) Both are dimensionless d) Siemen, Ohm

13) For 100 % series compensation, resonance occur at
a) Power frequency b) 50 % of power frequency
c) 40 % of power frequency d) None of the above

14) Find out the wrong relationship.
a) $[Q] = 2\pi\varepsilon[M][V]$ b) $[V] = [P]\left[\frac{Q}{2\pi\varepsilon}\right]$
c) $\left[\frac{Q}{2\pi\varepsilon}\right] = [P]\,[V]$ d) All equations are correct

15) The positive sequence reactance per phase in ohms 1 km in 750 transmission line is
a) 0.272 b) 0.227 c) 0.722 d) none of these

16) The radio interference level is governed by
a) Amplitude of single phase b) Wave shape of single pulse
c) Repetitive nature of pulse d) All of these

17) The main drawback of overhead system over underground system is
a) Underground system is more flexible than overhead system
b) Higher charging current
c) Surge problem
d) High initial cost

18) In lossless transmission line theoretically have
a) r = l = 0 b) l = g = 0 c) g = c = 0 d) r = g = 0

19) Refraction coefficient of current (J_T) is given by
a) $\frac{2Zo}{Zo + Zt}$ b) $\frac{Zo - Zt}{Zo + Zt}$ c) $\frac{2Zt}{Zo + Zt}$ d) $\frac{Zt - Zo}{Zo + Zt}$

20) Which type of corona discharge gives interference to radio broadcast ?
a) Pulse type b) Pulse less type
c) Glow corona d) None of the above

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Day and Date : Tuesday, 6-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Write short notes on **any four** : **(4×5=20)**
   a) Explain in detail the advantages and disadvantages of high voltages.
   b) Explain :
      i) Aeolian vibration
      ii) Galloping vibration
   c) Brief the charge potential relations of the multi conductor lines.
   d) Explain Reflection and refraction of travelling waves.
   e) Lightning stroke mechanism.
   f) Explain tower footing resistance.
   g) Limits for radio interference.

3. Solve **any two** : **(2×10=20)**
   a) Describe the line parameters of modes of propagation.
   b) Explain in detail the sequence inductance and capacitance.
   c) Derive the expression $P_C = \frac{1}{2} KC \left(V_m^2 - V_o^2 \right)$ for the energy loss from charge-voltage diagram.

SECTION – II

4. Write short notes on **any four** : **(4×5=20)**
   a) Power circle diagram and its use.
   b) Enlist sources of overvoltage and explain Ferro resonance voltages.
   c) Sub-synchronous resonance in series capacitors compensated lines.
   d) Reduction of switching surge over voltages.
   e) Construction and characteristics of ZnO gapless arrester.
   f) Describe the insulation co-ordination and over voltage protection based on lightning.

Set P

5. Solve **any two** : **(2×10=20)**

   a) Expression for generalized constants.

   b) What are the factors under steady state in design of EHV lines ?

   c) 100 MVA 230 KV 50 Hz transformer has X_f = 12 % and is connected to a line 200 Km long which has an inductance of 1 mH/Km. The filter connected to the L.V side 33 KV of the transformer, is required to suppress the 5^{th} harmonic generated by the TCR to 1 % of I_n. Calculate the value of filter capacitor if the filter inductance used in 2 mH.
