16117

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory*.

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Solve any THREE : **12**

(a) Why electrical power is to be transmitted at high voltage ?

(b) Compare overhead lines with underground cable for transmission of electrical power on following four points :

(i) Fault location

(ii) Initial cost

(iii) Useful life

(iv) Safety

(c) What are ACSR conductors ? State their advantages.

(d) Explain the effect of R, L and C on 1-phase transmission line.

(B) Solve any ONE : **6**

(a) What is skin effect ? On which factors does the skin effect depend.

(b) Write the classification of transmission line based on length and operating voltage.

2. Solve any FOUR : **16**

(a) Draw the power system network. Show all voltage levels.

(b) Compare suitability of copper and Aluminium as a conductor material for transmission lines on following four points :

(i) Resistivity

(ii) Current density

(iii) Cost

(iv) Tensile strength

(c) What are the various parts of three phase conductor high voltage cables ? Explain with neat sketch.

(d) State Ferranti effect of transmission line where these effects occur.

(e) Define efficiency and regulation of transmission line.

3. Solve any TWO : **16**

(a) Define string efficiency and develop its mathematical expression.

(b) (i) State the advantages and disadvantages of Corona.

(ii) Draw a single line diagram showing a typical distribution system.

(c) A single phase overhead transmission line delivers 2000 kW at 33 kV at 0.85 p.f. lagging. The total resistance and inductive reactance of the line are 10 ohm and 15 ohm respectively. Determine :

(i) Sending end voltage

(ii) Sending end p.f. and

(iii) Transmission efficiency

4. (A) Solve any THREE : **12**

(a) Draw and explain with a neat sketch double circuit RCC pole.

(b) What is the difference between nominal T and nominal Π method of medium transmission line ?

(c) Define EHVAC transmission line. State its necessity and importance.

(d) Classify substations on the basis of (i) service requirement (ii) constructional features.

(B) Solve any ONE : **6**

(a) Draw single line diagram of primary and secondary distribution system with voltage levels and load shown.

(b) Compare indoor and outdoor substation on the basis of following factors :

(i) Space required

(ii) Time for erection

(iii) Capital cost

(iv) Maintenance

(v) Fault location

(vi) future expansion

5. Solve any FOUR : **$4 \times 4 = 16$**

(a) State advantages, disadvantages and applications of steel tower.

(b) Draw a block diagram of HVDC transmission starting from generator.

(c) Explain in brief ring main system.

(d) State the requirements of an ideal distribution system.

(e) Draw the symbol and state the function of following components of 33/11 kV substation :

(i) Bus bar

(ii) Power Transformer

(iii) Lightning Arrester

(iv) Circuit Breaker

6. Solve any TWO : **16**

(a) (i) State four factors which affect the life of line insulator.

(ii) State the different types of line insulators and explain any one of them.

(b) Explain effect of load power factor on performance of transmission line.

(c) (i) Compare EHVAC and HVDC transmission line on following four points :

(1) Design of circuit breaker and switches

(2) Number of conductors

(3) Skin effect

(4) Transmission capacitance

(ii) Draw the single line diagram of 11 kV/400 V indoor substation.

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