



RN-8209

B. E. - II (Sem. IV) (Electrical) Examination
May / June - 2010
Electrical Power

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दृशविले निशानीवाणी विगतो उत्तरवही पर अवश्य लखवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. - 2 (Sem. 4) (Electrical)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="Electrical Power"/>	<input type="text"/>
Subject Code No. : <input type="text" value="8"/> <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="9"/>	<input type="text"/>
Section No. (1, 2,.....) : <input type="text" value="1&2"/>	
Student's Signature	

- (2) Answers to the **two** sections must be written in **separate** answer books.
- (3) Figures to the RHS indicate full marks.
- (4) Assume suitable data wherever necessary.
- (5) Attempt **all** questions.

SECTION - I

- 1 (a) Explain, what do you understand by the following terms : **10**
- (i) Spillway
 - (ii) Penstock
 - (iii) Surge tank
 - (iv) Pin type insulator
 - (v) Direct laying of underground cables.
- (b) Giving neat sketches explain the working of **10**
pressurised water reactor and boiling water reactor.

OR

- (b) (i) With neat sketch, describe different types of cables used for 3-ph service. 5
- (ii) A 3 ph overhead transmission line is being supported by three disc insulators. The potentials across top unit (i.e. near to the tower) and middle unit are 8 kV and 11 kV respectively. Calculate : 5
 (a) the ratio of capacitance between pin and earth to the self capacitance of each unit (b) the line voltage and (iii) string efficiency.
- 2 (a) Discuss the advantages and disadvantages of hydro-electric power plant. 5
- (b) A hydro electric installation has a catchment area of $4 \times 10^5 \text{ m}^2$ and effective head of 200 m. Estimate fall in reservoir level after a load of 20,000 kW has been supplied for 5 hours, hydraulic efficiency = 80%. 3
- (c) A 3 phase 50 Hz transmission line 100 km long delivers 20 mW at 0.9 pf lagging and at 110 kV. The resistance and reactance of the line per phase per km are 0.2Ω and 0.4Ω respectively, while capacitive admittance is $2.5 \times 10^{-6} \text{ mho/km/ph}$. 7
Calculate :
 (i) the current and voltage at the sending end
 (ii) efficiency of transmission
 Use nominal T method.
- 3 Attempt any **three** : 15
- (i) What is importance of rain fall and run-off data in the design of hydro electric power plant.
- (ii) Which are the methods of improving the string efficiency?
- (iii) Compare overhead system with underground distribution system.
- (iv) A load of 1730 kW at 0.8 pf lagging is received at the end of 3ph trnsmission line at 10 kV. The res. and reactance of each conductor are 2.5 and 6Ω respectively. Find for this line (a) % Reg. (b) % η (c) reduction in line loss if p.f. is raised to unity.
- (v) Explain base load power plant and peak load power plant.

SECTION - II

- 4 (a) Fill in the blanks : 5
- (i) If the length of a transmission line increases, its inductance is _____.
 - (ii) If the supply frequency increases, then skin effect is _____.
 - (iii) Thermal power station has _____ initial cost than hydro-electric generating station.
 - (iv) If capacitance between two conductors of 3-phase line is 6 micro farad then capacitance of each conductor to neutral is _____.
 - (v) The dc resistance of a line conductor is _____ than its ac resistance.
- (b) True or False: 5
- (i) If the spacing between the conductor increases, the inductance of the line increases.
 - (ii) Super heating decreases the overall efficiency of the plant.
 - (iii) Water is conventional types of energy source.
 - (iv) The geometrical mean radius is given as $r' = 0.7788r$.
 - (v) Wind and geothermal are the conventional types of energy sources.
- (c) Explain types of steam prime movers. 6
- (d) Explain skin effect and proximity effect. 4
- 5 (a) Derive equation for inductance of three phase three wire line with symmetrical spacing and unsymmetrical spacing. 7
- (b) A 3 phase overhead transmission line has its conductors arranged at the corners of an equilateral triangle of 3 m side. Calculate the capacitance of each line conductor per km if diameter of each conductor is 1.5 cm. 8

OR

- 5 (a) Derive equation of capacitance for single phase two wire line and capacitor between one wire and earth. 7
- (b) Three conductors of a 3 phase line are arranged at the corners of a triangle of sides 3 m, 3.5 m and 4.2 m. Calculate the inductance per km of the line when the conductors are regularly transposed. Consider the diameter of each conductor to be 1.5 cm. 8
- 6 Write any **three** : 15
- (i) Explain advantages and disadvantages of thermal power station.
- (ii) Explain the coal and ash handling cycle in modern thermal power plant.
- (iii) Draw and explain block diagram of gas turbine power plant.
- (iv) What is the function of condenser used in TPS, explain the condenser used in the modern TPS.
- (v) Write disadvantages of low power factor.
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