



SF-8190

B. E. - II (Sem. IV) (Electrical) Examination

May / June - 2011

Electrical Power

(New Syllabus)

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दशांश देव निशानीवाणी विगतो उत्तरवही पर अवश्य कर्षवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. - 2 (SEM. 4) (ELECTRICAL)

Name of the Subject :
ELECTRICAL POWER (NEW)

Subject Code No. : 8 1 9 0 Section No. (1, 2.....) : NIL

Seat No. :

Student's Signature

- (2) Attempt all questions.
(3) Make suitable assumptions, wherever necessary.
(4) Figures to the right side indicate full marks.

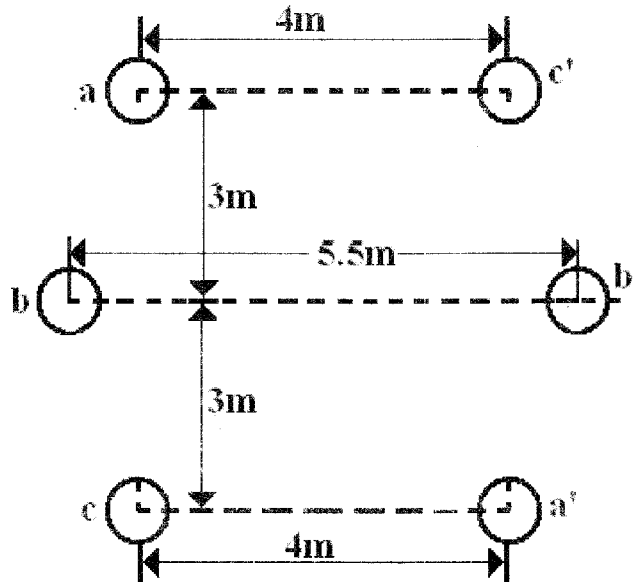
1 (a) True or false : 5

- (i) Super heating decreases the overall efficiency of the plant.
(ii) Bio-gas and geothermal are the non-conventional types of energy sources.
(iii) The dc resistance of a line conductor is less than its ac resistance.
(iv) If the length of the line decreased, its capacitance is increased.
(v) If the spacing between the conductor increases, the inductance of the line increases.

(b) Fill in the blanks : 5

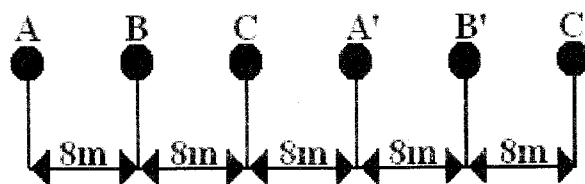
- (i) If capacitance between two conductors of 3-phase line is 6 micro farad then capacitance of each conductor to neutral is _____.
(ii) The skin effect is _____ for standard conductor than solid conductor.
(iii) Water is _____ types of energy source.

- (iv) Thermal power station has _____ initial cost than hydro-electric generating station.
- (v) The running cost of TPS is _____ then hydro power station.
- (c) Explain skin effect and proximity effect. 5
- (d) Write advantages of power factor improvement. 5
- 2 (a) Derive equation for inductance of three phase three wire line with symmetrical spacing and unsymmetrical spacing. 7
- (b) Find the inductance per phase per km of double circuit 3-phase line shown in figure. The conductor are transposed and are of radius 0.75 cm each. The phase sequence is ABC. 8



OR

- 2 (a) Derive equation of capacitance for single phase two wire line and composite conductor line. 7
- (b) Calculate the inductance per phase per metre for a three phase double circuit line whose phase conductors have a radius of 5.3 cm with the horizontal conductor arrangement as shown in figure. 8



- 3 Write any three :** **15**
- (i) Explain advantages and disadvantages of thermal power station.
 - (ii) Explain advantages and limitations of wind energy conversion.
 - (iii) Explain the coal and ash handling cycle in modern thermal power plant.
 - (iv) Draw and explain schematic diagram thermal power plant.
 - (v) Explain all types of prime movers.
- 4 (a) Fill in the blanks by inserting appropriate words/figure :** **5**
- (i) In medium transmission lines, effects of _____ are taken into account.
 - (ii) In short transmission lines, the effect of _____ is neglected.
 - (iii) For a given V_R and I, the regulation on the line _____ with decrease in pf for lagging loads.
 - (iv) In the analysis of 3-phase transmission line, only _____ is considered.
 - (v) If the pf of the load decreases, the line losses _____.
- (b) Pick up the correct words/figures from the brackets and fill in the blanks :** **5**
- (i) The minimum dielectric stress in a cable is at _____ (conductor surface, lead sheath)
 - (ii) Voids in the layers of impregnated paper insulation _____ the breakdown voltage of the cable. (increase, decrease)
 - (iii) For voltages beyond 66 kV, 3-phase system usually employs _____. (3-core cable, 3 single core cable).
 - (iv) The line constants of a transmission line are _____. (uniformly distributed, lumped)
 - (v) The length of short transmission line is upto about _____ (50 km, 120 km, 200 km)
- (c) Discuss different methods of improving string efficiency in case of suspension type insulator string.** **5**
- (d) Describe the main constructional features of pin and string insulators.** **5**

- 5 (a) What is the most economical pf ? Derive its expression. 5
- (b) A 3-phase line delivers 3600 kW at a pf 0.8 lagging 10
to a load. If the sending end voltage is 33 kV, determine
the receiving end voltage, line current, transmission
efficiency. The resistance and reactance of each conductor
is $5.31\ \Omega$ and $5.54\ \Omega$ respectively.

OR

- 5 (a) Define the following terms : 5
(i) Voltage regulation
(ii) Transmission efficiency.
- (b) A 3-phase line has a resistance and reactance per 7
phase of $1\ \Omega$ and $3\ \Omega$ respectively and supplies a load
of 20 MW at unity pf. Calculate sending end voltage
of the line if the efficiency of transmission line is 42%.
- (c) The effective water head for a 150 MW hydro electric 3
station is 250 m. The station supplies full load for
14 hours per day. If overall efficiency for the station is
85%, find the volume of water used in m^3/day .
- 6 Attempt any three : 15
- (i) Discuss the various types of Hydel plants and their field
of use.
- (ii) Explain the base load power plant and peak load power
plant.
- (iii) Explain various types of turbines used in hydro power
plant.
- (iv) Define :
(a) Load factor
(b) Load duration curve
(c) Plant utilisation factor
- (v) Explain the classification of nuclear reactors.