D 51342 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2008

EE 04 704 – POWER SYSTEMS – III

(2004 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

I. (a) Explain briefly the current interruption in A.C. circuit breaker.

(b) Differentiate between surge diverter and surge absorber.

(c) What are the basic requirements of protective relaying?

(d) Explain about the protection of alternators against stator interturn faults.

(e) Explain the mechanics of traction.

(f) Explain with reasons, the desirable properties of resistance heating element.

(g) How various control centres in SCADA system communicate with each other?

(h) What is a D.C. link?

(8 × 5 = 40 marks)

Part B

II. (a) With a neat diagram, explain the principle of operation of a SF_6 circuit breaker.

(b) A circuit breaker is rated as follows 1500 A, 1000 MVA, 33 KV, 3 phase O.C.B. From above data determine the followings : (i) Rated normal current ; (ii) Rated symmetrical breaking current ; and (iii) Rated making current.

(9 + 6 = 15 marks)

Or

(c) Show that a travelling wave moves with a velocity of light on the overhead line and its speed is proportional to $\frac{1}{\sqrt{\varepsilon_r}}$ on a cable with dielectric material of permittivity ε_r.

(15 marks)

III. (a) What are the problems that arise in differential protection applied to power transformer.

(b) Explain the Merz-Price protection scheme of power transformers.

(6 + 9 = 15 marks)

Or

Turn over

(c) Explain the construction, principle of operation and application of an overcurrent relay with IDMT characteristics.

(d) With a neat block diagram, explain the microprocessor based overcurrent protective relays.

(9 + 6 = 15 marks)

IV. (a) Describe various system of traction. Give merits and demerits of each.

(15 marks)

Or

(b) Discuss various methods of controlling the temperature in resistance ovens.

(c) A 15 kW, 230 V single-phase resistance oven employs nickel-chrome wire for its heating elements. If the wire temperature is not to exceed 1000° C and the temperature of the charge is to be 600° C, calculate the diameter and length of wire. Assume radiating efficiency as 0.6 and emissivity as 0.9. Determine also the temperature of the wire when the charge is cold. Specific resistance of nickel-chrome wire is 1.016 μΩm (1.016 micro-ohm metre).

(5 + 10 = 15 marks)

V. (a) Compare high voltage AC and DC systems. Give an account of the EHV systems in India.

(15 marks)

Or

(b) What is FACTS?

(c) Briefly explain various FACTS controllers.

(6 + 9 = 15 marks)

[4 × 15 = 60 marks]