



RN-7405

B. E. - IV (Sem. VII) (Electrical) Examination
May / June - 2010
Electrical Power System - III

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दृशविवेक निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
B. E. - 4 (Sem. 7) (Electrical)	<input type="text"/>
Name of the Subject :	<input type="text"/>
Electrical Power System - 3	<input type="text"/>
Subject Code No. : <input type="text"/> 7 <input type="text"/> 4 <input type="text"/> 0 <input type="text"/> 5	Section No. (1, 2,.....): <input type="text"/> 1&2
	Student's Signature

- (2) Please write answers in point wise and try to avoid essay type answers. (Theory type answers are highly discouraged)
- (3) Due weightage will be given to neat and clean answer-sheets.
- (4) Write both sections in separate answer sheets.
- (5) Make assumptions, wherever you feel required.

SECTION - I

- | | | |
|-----------|--|-----------|
| 1 | A Explain the following terms w.r.t Circuit breakers in short : (2 marks each) | 10 |
| | 1 Current Chopping | 2 |
| | 2 What is a " Puffer " with respect to a circuitbreaker ? | 2 |
| | 3 What is "rupturing capacity" of CB and what should its value be ? | 2 |
| | 4 What is Kelvins law of Fuse ? | 2 |
| | 5 Why is d.c arc difficult to extinguish ? | 2 |
| | B List the various equipments used for a typical 220/ 11 kv substation. Explain the function of each in brief | 8 |
| 2 | A Write notes on Resistance Switching in HV circuit breakers. | 6 |
| | B Multibreak circuit breakers | 6 |
| | C Discuss the principle of arc extinction in oil CB with reference to restriking and recovery voltages. | 6 |
| OR | | |
| 2 | A Enumerate the chief requirements of the contact material for a vacuum circuit breaker ? | 6 |
| | B Write a note on Capacitive current chopping. Why is current chopping not a serious problem with vacuum circuit breakers ? | 6 |
| | C State and explain factors affecting the performance of ABCB's . | 6 |

- 3 A Explain with help of neat circuit diagram any one current injection method of testing H.V. circuit breakers. 7
- B Calculate the RRRV of a 220 KV circuit breaker with earthed neutral. The short circuit test data obtained is : The current broken is symmetrical and the restriking voltage has an oscillatory frequency of 15 KHz. The power factor of the fault is 0.2. Assume the short circuit to be an earth fault. 7

OR

- 3 A Giving the layout of short-circuit testing plant, explain the function of each of its components. Also explain how the testing is carried out in such a plant. 7
- B What are the practical limitations of breaking high voltage direct current circuits ? Explain some of the means of overcoming these difficulties. 7

SECTION -II

- Q-4 (a) 1) Explain the term spinning reserve? (12)
- 2) Explain the significance of load factor and diversity factor
- 3) What are the advantages of dynamic programming?
- 4) Draw the fine heat rate curve and incremental fuel cost curve with their units
- 5) What is penalty factor?
- 6) Explain in brief Availability based tariff (ABT)

- Q-4 (b) A residential consumer has following gazettes at his premises : 8 bulbs (06)
of 100 Watt, 2 fans of 60 Watt each and 2 tube lights of 50 Watt each,
his use of electricity during a day is as under .

12:00 midnight to 5:00 am	1- fan
5:00 am to 7 :00 am	2- fans + 1 tube light
7:00 am to 9 :00 am	Nil
9:00 am to 6 :00 pm	2- fans
6:00 pm to Midnight	2- fans + 4 Bulbs

Find (1) connected Load (2) Maximum Demand (3) Demand factor (4) Energy consumed during 24 hours (5) Energy consumed in 24 hours if all the devices are used for whole day (6) plot the variation of load demand Vs time of the day

- Q-5 (a) Derive the Generalized formula of B_{mn} loss coefficient and also discuss the term penalty factor (07)

Q-5 (b) The fuel inputs per hour of plants 1 and 2 are given as under (09)

$$F_1 = 0.2 P_1^2 + 40 P_1 + 120 \text{ Rs. per Hr.} \quad F_2 = 0.25 P_2^2 + 30 P_2 + 150 \text{ Rs. per Hr.}$$

Determine the economic operating schedule and the corresponding cost of generation if the max and min loading on each unit is 100 MW and 25MW, the demand is 180 MW, and transmission losses are neglected. if the load is equally shared by both the units , determine the saving obtained by loading the units as per equal incremental production cost.

OR

Q-5 (a) Write a short note on economic load sharing between two generators in the same plant considering transmission line losses (08)

Q-5 (b) A system consists of 2 plants connected by a tie line and a load located at plant 2. When 100 MW are transmitted from plant 1, a loss of 10 MW takes place on the tie-line. Determine the generation schedule at both the plants and the power received by the load when λ for the system is Rs. 25 per MWh and the incremental fuel cost given by equations: (08)

$$\frac{dF_1}{dP_1} = 0.03 P_1 + 17 \text{ Rs. per MWh.} \quad \frac{dF_2}{dP_2} = 0.06 P_2 + 19 \text{ Rs. per MWh.}$$

Q-6 Attempt any Two : (16)

- (1) Discuss the optimal scheduling of hydrothermal system
- (2) Write a short note on load forecasting
- (3) Discuss the different methods of calculating depreciation charges of power plant
- (4) A 250KVA distribution transformer costs 20,000 rs and has a salvge value of 1000rs at the end of 20 years , determine the depreciated value of the plant at the end of 10 years by (1) Straight line method (2) Sinking Fund method