Please check that this question paper contains___09___ questions and _02_ printed pages within first ten minutes.

[Total No. of Questions: 09] [Total No. of Pages: 02] MORNING

Uni. Roll No. .....

19 SEP 2022

Program: B.Tech. (Batch 2018 onward)
Semester: 6th
Name of Subject: Power Systems-II (Operation and Control)
Subject Code: PCEE-114
Paper ID: 17226
Scientific calculator is Allowed

Time Allowed: 03 Hours **Max. Marks: 60**

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

Part – A **[Marks: 02 each]**

Q1.

a) Classify the power system buses and mention their known and unknown quantities.

b) Mention names of various methods used to solve swing equation.

c) Differentiate between single area and two area control systems.

d) Clarify the need to have monitoring and control of power system.

e) Suggest methods to improve stability of power system.

f) Give your comments on power system coupling.

Part – B **[Marks: 04 each]**

Q2. Describe the various types of electricity market models with suitable diagrams.

Q3. Why is it necessary to have energy control centres? Explain its various components.

Q4. How dynamics of a synchronous machine can be modelled? Derive the necessary equation used for it from basic principles.

Q5. Deduce the steady state load vs. frequency characteristics from block diagram model of a single area control system.

Q6. How stability of power system can be evaluated using equal area criterion? Explain by drawing various power angle curves.

Q7. Apply step by step method to form bus admittance matrix (Ybus) for the following system data. Ignore line charging admittances.

From Bus	To Bus	Line impedance (p.u.)
1	2	0.05+j 0.15
1	3	0.1+j 0.3
2	3	0.15+j 0.45
2	4	0.1+j 0.3
3	4	0.05+j 0.15

Analyse the impact of addition of a new line on Ybus.

Part – C **[Marks: 12 each]**

Q8. Explain the use of Gauss-Seidel method for the solution of load flow problem when PV buses are included. Derive the necessary equations used and draw flow chart.

OR

Explain the use of Newton-Raphson method for the solution of load flow problem when PV buses are included. Derive the necessary equations used and draw flow chart.

Q9. Give your reviews on the various methods used to control voltage, frequency, and power flow in power system.

OR

Give your reviews on the various methods used for assessment and improvement of power system security.

****