COMPUTER AIDED POWER SYSTEM STUDIES (SEMESTER - 8)

CS/B.TECH (EE)/SEM-8/EE-801A/09

1. ..... *Signature of Invigilator*

2. ..... *Signature of the Officer-in-Charge*

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

CS/B.TECH (EE)/SEM-8/EE-801A/09

ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL – 2009

COMPUTER AIDED POWER SYSTEM STUDIES (SEMESTER - 8)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

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FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B			Group – C			***Total Marks***	***Examiner's Signature***
Question Number																		
Marks Obtained																		

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Head-Examiner/Co-Ordinator/Scrutineer

8850-A/F (25/04)

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ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL – 2009

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GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

i) For fast load flow calculations, the last method is

a) Gauss-Sieda method b) Newton Raphson method

c) De Conpled method d) none of them. ☐

ii) The suitable value of acceleration factor is

a) 2·2 b) 1·6

c) 1·1 d) 3·1 ☐

iii) Area control error is minimised by

a) integral control b) thyristor control

c) governor control d) field control. ☐

iv) The unit for speed regulation of a governor is

a) Hz b) Hz/MVA

c) Hz/MW d) none of these. ☐

v) The unit of incremental cost of received power is

a) Rs/MWh b) MWh/Rs

c) Rs/MW/h d) h/Rs. ☐

vi) Polar co-ordinates are preferred for

a) N-R method b) G-S method

c) FDLF method d) none of these. ☐

vii) Sparsity oriented technique is related to

a) communication b) state estimation

c) computer memory d) voltage stability. ☐

viii) In load flow analysis, slack bus is to be considered as

a) load bus b) minimum generation bus

c) largest generation bus d) any bus

e) none of these. ☐

ix) Optimisation in hydrothermal plant is carried out with

a) real power generation as control variable

b) reactive power generation as control variable

c) both real and reactive power generation as control variable

d) frequency as controlled variable

e) none of these. ☐

x) Voltage of one bus depends on

a) load b) capacitor bank

c) synchronous condenser d) all of these. ☐

xi) The incremental transmission loss of a plant is always

a) positive b) negative

c) zero d) none of these. ☐

xii) The direction of active power flow between two bases depends on

a) angles between two bus

b) voltage magnitude difference between two bus

c) reactance of tranmission line

d) all of these

e) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What is meant by automatic generation control ? Discuss the advantages of inter-connected operation of power system. 2 + 3

3. Write the computational steps of Gauss-Siedal method for load bus. 5

4. What is load forecasting ? Discuss one method of load forecasting. 2 + 3

5. Draw and explain the flow-chart for solution of State Estimation (SE) algorithm. 2 + 3

6. For a power system having large number of nodes, how will you proceed to carry out power system studies by numerical computations ? Why is the *Y* bus spare in such systems ? 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following questions. 3 × 15 = 45

7. a) Discuss the system security function.

b) Discuss the different constraints considered in unit commitment problem. 8 + 7

8. a) A two bus system is shown in Fig. If 100 MW is transmitted from plant 1 to the load, a transmission loss of 10 MW is incurred. Find the required generation for each plant if the total load is 237 MW.

dia

b) Two generators rated 200 MW and 300 MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively from no-load to full-load. Assuming that the generators are operating at 50 Hz at no-load, how would a load of 500 MW be shared between them ? 8 + 7

9. a) What is meant by tie line bias control ? What are its objectives ? 3 + 2

b) Discuss the principles of automatic generation control in power system connected in grid with other neighbouring power system through tie line. 10

10. The following is the system data for a load flow solution :

The line admittances

Bus Code	***Admittance***
1 – 2	$2 - j\ 8{\cdot}0$
1 – 3	$1 - j\ 4{\cdot}0$
2 – 3	$0{\cdot}666 - j\ 2{\cdot}664$
2 – 4	$1 - j\ 4{\cdot}0$
3 – 4	$2 - j\ 8{\cdot}0$.

The schedule of active and reactive powers :

Bus Code	***P***	***Q***	***V***	***Remark***
1	—	—	1·06	Slack Bus
2	0·5	0·2	$1 + j\ 0$	$P - Q$ Bus
3	0·4	0·3	$1 + j\ 0$	$P - Q$ Bus
4	0·3	0·1	$1 + j\ 0$	$P - Q$ Bus

Determine the voltages at the end of 1st iteration using Gauss-Seidel method. Take acceleration factor $\alpha = 1{\cdot}6$. 15

11. Write short notes on any *three* of the following : 3 × 5

a) Method of least square for state estimation

b) Digital Governor for LFC

c) Optimal hydrothermal scheduling

d) SCADA

e) Real time computer control of power system.

END