Hall Ticket Number :

Code: 4G261

III B.Tech. II Semester Supplementary Examinations December 2017

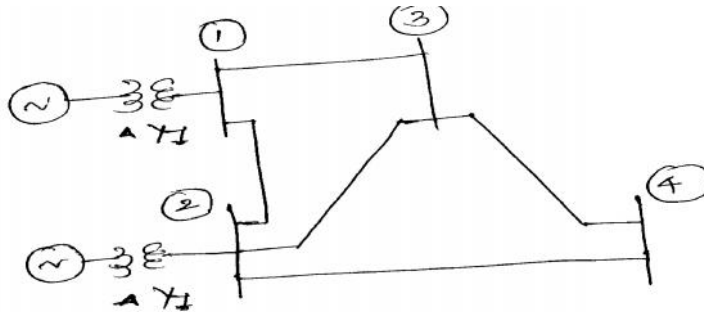## Power System Analysis

(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Define   5M

     i. Tree   ii. Branches   iii. Links   iv. Co-Tree   v. Basic loop   vi. Path

   b) Formulate the Y_{Bus} for the network shown in fig.1 using direct inspection method

9M

OR

2. Write the step-by-step algorithm for Z_{Bus} building for a network without considering mutual inductance and phase shifting transformers.   14M

UNIT–II

3. The following is the data for line load load flow solution

Bus Code	1-2	1-3	2-3	2-4	3-4
Y	2-j8	1-j4	0.66-j2.664	1-j4	2-j8

The schedule of active and reactive powers are

Bus code	1	2	3	4
P	-	0.5	0.4	0.3
Q	-	0.2	0.3	0.1
V	1.06	1+J0	1+J0	1+J0

Determine the voltage at the end of 1st iteration using G-S method. Take acceleration factor as 1.6   14M

OR

4. a) Derive the expression for load flow solutions and explain the importance of power flow analysis   7M

   b) Draw the flowchart of fast decoupled load flow method   7M

UNIT–III

5. a) Explain how formation of Z_{Bus} helps in determining the fault current   4M

   b) Obtain the expression for fault current for a line to line fault taken place through an impedance of Z_b in a power system   10M

OR

6. The one line diagram of an unloaded power system is as shown in figure 2. Draw the impedance diagram with all the reactance's marked in PU on a base of 50 MVA, 13.8KV.
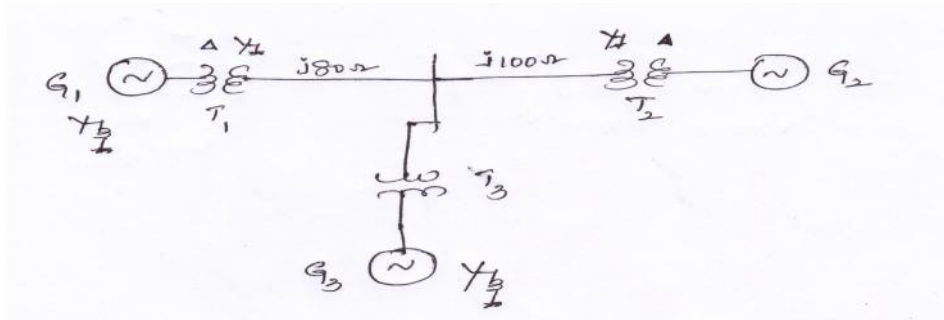
G1: 20MVA, 13.8KV, $X^{"}$ = 0.2pu

G2: 30MVA, 18KV, X" =0.2pu

G3 : 30MVA, 20KV, X" =0.2pu

T1: 25MVA 220/13.8KV X = 10%

T2:Single phase units rated at 10MVA,127/18KV X = 10%

T3: 35MVA, 220/22KV X = 10%

    14M

UNIT–IV

7. a) Define steady state stability and stability limit with the help of power-power angle curve. What are the techniques available to improve steady state stability?   8M

   b) Distinguish between steady state, dynamic and transient stability?   6M

OR

8. a) A 3 phase 50 Hz transmission line is 200 Km long. The line parameters are r = 0.1 ohm /Km; x = 0.25 ohm/km; y = 3 × 10-6 mho / Km. The line is represented by nominal   model. If |VS| = |VR| = 200KV determine steady state stability limit.   7M

   b) A 275 KV transmission line has following line constants. A = 0.85 $\angle 5^0$, B = 200 $\angle 75^0$ The line delivers 150 MW with |VS| = |VR| = 275KV. Determine synchronizing power coefficient   7M

UNIT–V

9. a) Explain the methods of improving transient stability   6M

   b) Explain the term critical clearing angle and critical clearing time in connection with the transient stability of power system   8M

OR

10. a) Derive the swing equation   7M

    b) Explain equal area criteria for transient analysis   7M

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III B.Tech. II Semester Supplementary Examinations December 2017

Power System Operation and Control

(Electrical & Electronics Engineering)

Max. Marks: 70　　　　　　　　　　　　　　　　　　　　　　Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the following terms with reference to the power plants: Heat input, Power output curve, Heat rate input, Incremental input, Generation cost and Production cost.　　7M

   b) The cost curves of two generators may be approximated by second degree polynomials:

   $$C_1 = 0.1\, P_{G1}^2 + 20\, P_{G1} + \propto_1$$
   $$C_2 = 0.1\, P_{G2}^2 + 30\, P_{G2} + \propto_2$$

   Where $\propto_1$ and $\propto_2$ are constants.

   If the total demand on the generators is 200 MW, find the optimum generator settings. How many rupees per hour would be losing if the generators were operated about 15% of the optimum setting?　　7M

OR

2. a) What are the methods of scheduling of generation of steam plants? Explain their merits and demerits.　　7M

   b) The incremental production cost of two plants are given by:

   $(IPC)_1 = (0.07)P_1 + 16$ *Rs./MWh*

   $(IPC)_2 = (0.08)P_2 + 12$ *Rs./MWh*

   The loss coefficients of the system are given by $B_{11} = 0.001$; $B_{12} = B_{21} = -0.005$ and $B_{22} = 0.0024$. The total load to be met is 150 *MW*, determine the economic operating schedule if the transmission line losses are coordinated and the losses are included but not co-ordinate.　　7M

UNIT–II

3. a) Derive the transfer function of an overall excitation system.　　7M

   b) In a two plant operating system, hydro plant operates for 12 hours during each day and steam plant operates all the day. Characteristics of steam and hydro plants are given below. When both plants are operating, power flow from steam plant is 300MW. Total water used by hydro plant during 12 hrs of operation is 180×10^6 m^3. Determine the generation of hydro power plant & ".[assume constant load, no losses]

   $$C_T = 0.3P_T^2 + 20P_T + 5\, \frac{Rs}{hr}$$
   $$W_H = 0.4P_H^2 + 20P_H \, m^3/sec$$
   　　7M

OR

4. a) What are the advantages of operation of Hydrothermal combinations?　　7M

   b) Discuss optimal power flow problems with and without inequality constraints. How are these problems solved?　　7M

5. a) Develop the Linearized modeling of a hydraulic turbine.   7M

    b) Explain the operation of Speed- Governing System with neat sketch and develop the
        mathematical model.   7M

OR

6. a) Explain the methods of providing excitation system.   7M

    b) Derive the transfer function and block diagram of IEEE Type-1 model.   7M

UNIT–IV

7. a) What is meant by tie line bias control?   4M

    b) Two generating stations A and B have the capacities 400MW and 700MW respectively
        are interconnected by a short line. The percentage speed regulations from no load to full
        load of the two stations are 2 and 3 respectively. Find the power generation at each
        station and power transfer through the line if the load on bus of each station is 200MW.   10M

OR

8. a) Derive the transfer function for proportional integral control of a single area system   7M

    b) What are the requirements of the control strategy in LFC?   7M

UNIT–V

9. a) How the following devices generate/absorb reactive power.

        i)   Synchronous machine
        ii) Over head lines
        iii) Shunt reactor   7M

    b) What is meant by compensation of line and discuss briefly different methods of compensation 7M

OR

10. a) Compare the different types of compensating equipment for transmission systems.   7M

    b)   Explain the effect of uncompensated line under no load and load condition.   7M

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R-14

II B.Tech. II Semester Supplementary Examinations December 2017
Utilization of Electrical Energy
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) What is load equalization? With necessary illustrations, derive the expression motor torque for load equalization.   10M
    b) List out the factors considered while selecting an electric drive for a particular application.   4M

OR

2. a) How are the electric drives classified? Explain.   8M
    b) What is heating time constant? Explain how the rating of a motor is affected by the temperature rise.   6M

UNIT–II

3. a) What is dielectric heating? Derive an expression for the heat produced in a dielectric material and hence deduce the factors influencing dielectric heating.   6M
    b) Explain the processes of Carbon arc and Metallic arc welding.   8M

OR

4. a) Compare AC and DC welding on the following aspects

    (i)   Power consumption   (ii)   Arc stability

    (iii)   Cost   (iv)   Weight

    (v)   Suitability   (vi)   Electrode

    (vii) Operation   (viii)   efficiency   8M

    b) Explain the following welding schemes
        (i) Spot welding
        (ii) Butt welding   6M

UNIT–III

5. a) Explain the working of fluorescent with the help of the circuit diagram giving the function of each various parts. How stroboscopic effect is eliminated in fluorescent tube lighting?   8M
    b) What do you understand by Polar Curves? How is it useful to an illumination designer?   6M

OR

6. a) Two similar lamps having uniform intensity of 500 C.P. in all directions below the horizontal are mounted at a height of 4 meters. What must be maximum spacing between the lamps so that the illumination on the ground mid-way between the lamps shall be at least one half the illumination directly under the lamps?   6M
    b) Prove that in a filament lamp, the diameter of filament is directly proportional to $I^{2/3}$, where 'I' is the current flowing through the filament.   8M

UNIT–IV

7. a) Derive an expression for the distance travelled by an electric train using trapezoidal speed-time curve. 8M

    b) Outline the significant features of traction drives. 6M

OR

8. a) Discuss in detail why series motors are ideal for AC or DC traction. 6M

    b) Explain the process of plugging in
       (i) Induction motor
       (ii) DC Series motor 8M

UNIT–V

9. A 200 Tonne motor coach having four motors each developing 6000 N-M torque during acceleration, start from rest. If up gradient is 30 in 1000, gear ratio is 4, gear transmission efficiency is 90%, wheel radius is 45 cm, train resistance is 50 N per Tonne, addition of rotational inertia is 10%. Calculate time taken to attain speed of 50 kmph. If the line voltage is 3000 V dc and efficiency of motors is 85%, find the current drawn during notching period. 14M

OR

10. a) How does the 'train resistance' play its part in the mechanics of train motion? 6M

    b) How does the value of acceleration and retardation affect the specific energy consumption for a given run at a given schedule speed? 8M

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III B.Tech. II Semester Supplementary Examinations December 2017
Computer System Architecture
(Electrical & Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Describe the functional units and components that are used for understanding of computer organization.   8M

   b) Explain about multi processors and multi computers.   6M

OR

2. a) What is overflow and underflow. What is the reason?. If the computer is considered as infinite system do we still have these problems?.   8M

   b) Perform the arithmetic operations (+41)+(-15) and (-41)-(-15) in binary using 2's complement representation for negative numbers.   6M

UNIT–II

3. a) Construct 4-bit adder-subtractor with neat diagram.   6M

   b) What is a register? Explain register transfer using a block diagram and timing diagram?   8M

OR

4. a) Draw and explain the block diagram of stored program organization?   6M

   b) What is an instruction? Explain the operations of different memory reference instructions?   8M

UNIT–III

5. a) What is a control unit? Explain control memory with a block diagram?   6M

   b) Analyze Booths multiplication algorithm with example?   8M

OR

6. a) Explain addition and subtraction with signed magnitude data?   6M

   b) What are the major components of CPU? Explain the Register Organization with a block diagram?   8M

UNIT–IV

7. a) List and explain different asynchronous data transfer modes.   6M

   b) What is an Input-Output processor? Explain the need for Input-Output processor   8M

OR

8. a) Discuss the methods in Cache Write? Explain its importance.   6M

   b) Discuss Virtual Memory Management technique. Explain the application of Virtual Memory   8M

UNIT–V

9. a) Explain vector processing. What is the difference between vector & array processing   8M

   b) Outline hazards to the instruction pipeline with their solution.   6M

OR

10. a) Explain the difference between tightly coupled multiprocessor and loosely coupled multiprocessor   4M

    b) Discuss Serial and parallel arbitration with diagrams.   10M

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III B.Tech. II Semester Supplementary Examinations December 2017
Microprocessors and Microcontrollers
(Electrical & Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. Draw and explain the functional block diagram of 8086 Micro Processor   14M

OR

2. Calculate the memory address the following instructions will access. Also explain the addressing modes that are used by each instruction.
    i) MOV CX, [1234H]   ii) MOV AX, [2222H]
    iii) MOV DX, [BP+DI]   iv) MOV DX, [BP + SI + 200H]
    v) MOV DX, [BP + DI + 01H]   vi) MOV AX, 1234H
    vii) MOV DX, [BX+04]   14M

UNIT–II

3. Discuss how to determine the control word for 8255.   14M

OR

4. Draw the functional diagram of 8255 and explain each block.   14M

UNIT–III

5. Draw and explain 8259A programmable interrupt controller.   14M

OR

6. Explain briefly interrupt vector table of 8086 Microprocessor.   14M

UNIT–IV

7. a) Give an overview RS-232C serial data standard   8M

    b) Write short notes on IEEE-488 standard   6M

OR

8. Explain the need for RS-232C interface, and explain serial communication standards with respect to the voltage levels   14M

UNIT–V

9. a) Write an 8051-assembly program to find GCD of two numbers.   8M

    b) Explain the various modes of timer operation with diagram.   6M

OR

10. Explain the various addressing modes of 8051, and give examples.   14M

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