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M.Tech. 1st Semester (Power System) (CBCS Scheme) Examination – January, 2023

POWER SYSTEM ANALYSIS

Paper : 22MPS21C1

Time : Three hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all. Q. No. 1 is *compulsory*. Attempt *four* more question from the sections A, B, C & D by selecting *one* question from each Section.

1. (a) What are the merits in formation of Y- bus matrix by direct inspection methods ?

(b) What are the advantages of Newton Raphson Method over Gauss Seidel Method ?

(c) Discuss contingency ranking .

(d) Write the significances of short circuit MVA calculations.

(e) What are the physical significances of sequence networks ?

$5 \times 4 = 20$

P. T. O.

SECTION – A

2. What are the steps are required to formation of Z-Bus using building algorithm. Develop the Z-Bus using building algorithm for a power system whose element data is given in the following table : 20

Element No.	Connected between Bus No.	Impedance (p.u.)
1	1-2	0.30
2	1-3	0.15
3	2-3	0.35
4	2-4	0.20
5	3-4	0.15

3. A network has bus admittance matrix which is given as follows : 20

$$Y_{Bus} = \begin{bmatrix} 6.6667 & -5 & 0 & 0 \\ -5 & 14.5 & -5 & -2 \\ 0 & -5 & 9 & -4 \\ 0 & -2 & -4 & 8 \end{bmatrix}$$

Factorise it as $Y_{Bus} = LDL^t$ and check whether, $Y_{Bus} = LDL^t$. Also find the vector $Z_{Bus}^{(3)}$.

SECTION – B

4. (a) Briefly compare the Newton-Raphson method and Fast Decoupled power flow methods. 10

(b) Distinguish between D.C load flow and A.C load flow. 10

5. Write short notes on : 20

(a) Backward Forward Sweep method

(b) Current injection method

SECTION – C

6. Explain the significance of symmetrical components in power system. Derive the expression for symmetrical components of voltages in terms of phase voltages and hence obtain transformation matrix. 20

7. Derive the expression for fault current and draw the interconnection of sequence networks for line to line fault on the terminals of an unloaded generator. 20

SECTION – D

8. (a) What is the importance of contingency analysis in power system ? Explain it with example. 10

(b) Construct the column of bus impedance matrix when one line is added to the network. 10

9. (a) Describe the various operating states of a power system with a neat sketch. 10

(b) What is the importance of state estimation ? Explain the method of least squares. 10

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M. Tech. 1st Semester (Power System)
CBCS Scheme Examination – January, 2023
POWER SYSTEM STABILITY

Paper : 22MPS21C5

Time : Three hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question no. 1 is ***compulsory***. All question carry equal marks.

1. (a) Discuss the importance of state space approach for modelling a synchronous machine. 5

(b) What is the concept of power system stability and the term transient stability ? 5

(c) Brief the power transfer characteristics of two machine system. 5

(d) Enlist the Voltage stability enhancement techniques. 5

SECTION – A

2. Derive an expression for output power equation of a synchronous machine. 20

3. Write down the simplified expression for stator self inductances L_{aa}, L_{bb} and L_{cc} in terms of equal constant term (L_s) in all three phases and equal coefficients of second harmonic term (L_m) in the three phases. 20

SECTION – B

4. Discuss any *two* eigen properties of state matrix. How eigen values effect the stability of a system ? 20

5. Obtain the classical model of single machine connected to an infinity bus. 20

SECTION – C

6. What is power angle diagram ? Explain clearly the equal area criterion for studying the transient stability of a power system. 20

7. Discuss about multi machine stability under faulted conditions. 20

SECTION – D

8. Outline the characteristics of generator, transmission system and load characteristics and their importance in voltage stability analysis. 20

9. Write short notes on : 20
   (a) Voltage stability enhancement technique
   (b) Static and Dynamic modelling of power system

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M. Tech. 1st Semester (Power System)

CBCS Scheme

Examination – January, 2023

ECONOMIC OPERATION OF POWER SYSTEMS

Paper : 22MPS21C2

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is ***compulsory***. All questions carry equal marks.

1. (a) What is Economic Dispatch Problem ? 5

   (b) Enlist various constraints in unit commitment. 5

   (c) How Hydroelectric Plant Models are created ? 5

   (d) What is Automatic Generation Control ? 5

SECTION – A

2. (a) Explain characteristics of Steam Units. 10

(b) Write about economic dispatch of Thermal Units. 10

3. What are iterative and non-iterative methods of solutions ? 20

SECTION – B

4. Define unit commitment, its various constraints and their solution methods. 20

5. Write a note on : $10 \times 2 = 20$

(a) Dynamic programming solution

(b) Priority in unit commitment.

SECTION – C

6. (a) What is short term hydro thermal scheduling problem ? 10

(b) How hydro units are used in series ? 10

7. What is hydro scheduling using Dynamic programming and linear programming ? 20

SECTION – D

8. (a) What is control of generation ? 10

(b) What are various models of power system elements ? 10

9. How state variable model of single area and two area systems is developed ? 20

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M. Tech. 1st Semester (Power System)

CBCS Scheme

Examination – January, 2023

SMART GRID TECHNOLOGY

Paper : 22MPS21C4

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (i) Explain the concept of smart Grid. 4
   (ii) Write the communication and standards of smart grid. 4
   (iii) Describe the storage component in smart grid. 4
   (iv) Describe the planning in smart grid. 4
   (v) Write about the ancillary service. 4

SECTION – A

2. Describe the compulsion of Today's Grid and Smart Grid. 20

3. Write short notes on : $2 \times 10 = 20$

(a) Micro Grid

(b) Distributed Generation

SECTION – B

4. Explain the optimal power flow concept in smart grid. 20

5. Write short notes on : $2 \times 10 = 20$

(a) Demand side management

(b) Voltage instability

SECTION – C

6. Describe the voltage stability assessment techniques. 20

7. Write short notes on : $2 \times 10 = 20$

(a) Voltage collapse

(b) Voltage stability index

SECTION – D

8. Write short notes on : $2 \times 10 = 20$

(a) Contingency analysis

(b) Economic dispatch

9. Describe the operational aspects and bottleneck in smart grid. 20

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M. Tech. 1st Semester (Power System)
CBCS Scheme Examination – January, 2023

ELECTRIC POWER DISTRIBUTION SYSTEM

Paper : 22MPS21C3

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all. Question No. 1 is *compulsory*. Attempt *four* more questions from the Sections-**A, B, C & D** by selecting at least *one* question from each Section.

1. (a) What do you mean by Load Balancing ?

$5 \times 4 = 20$

(b) Discuss the problems with existing distribution system.

(c) Differentiate between Energy accounting and Energy audit.

(d) Explain the types of need based energy management system.

SECTION – A

2. Draw and explain the layout of basic distribution system in detail. 20

3. What are the functions of Distribution transformer ? Explain the reasons for DT failures in detail. 20

SECTION – B

4. What is Distribution Automation ? Discuss the need of distribution automation and characteristics of distribution networks in detail. 20

5. What is Power factor correction ? Discuss the problems associated with Automatic Meter reading implementation and what is the solution to these problems ? 20

SECTION – C

6. Discuss concept of AT & C losses in distribution system. Which factors contribute to high Technical and Commercial losses and how they can be reduced ? 20

7. Discuss Objectives, functions and scope of Energy audit of power distribution system in detail. 20

SECTION – D

8. Discuss Objectives and advantages of Need based Energy Management. 20

9. Explain the DSM on Industrial sector and Agriculture sector in detail. 20

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Open Elective 2nd Semester (ECE) CBCS Scheme Examination – May, 2023

MULTIMEDIA COMMUNICATION

Paper : 16ECE01

Time : Three hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is ***compulsory***. Students have to attempt *five* questions in total, first being ***compulsory*** and selecting ***one*** from each Unit.

1. (a) What are HDTV Formats ? Explain SIF Vs CIF. 4

(b) Explain in detail Huffman code tree. 4

(c) Write a short note on MPEG2. 4

(d) Explain HTML is a Markup Language. 4

UNIT – I

2. (a) Draw and explain cable distribution network and terrestrial broadcast network. 8

(b) Explain in detail PCM Speech. What are its expander characteristic ? 8

3. (a) Explain multipoint conferencing. Also explain Digitization principles. 8

(b) Explain CD-quality audio and integrated services digital networks. 8

UNIT – II

4. (a) Explain differential encoding and transform encoding. 8

(b) Differentiate Lossless and Lossy compression. 8

5. (a) Explain in detail digitized documents. What are pass mode and vertical modes ? 8

(b) Explain JPEG. Also explain the quantization process of JPEG. 8

UNIT – III

6. (a) Explain with diagram Differential Pulse Code Modulation. 8

(b) Differentiate between Adaptive predictive coding and Linear predictive coding. 8

7. (a) Explain motion estimation and compensation in video compression. 8

(b) Write short notes on H.261 and H.263. 8

UNIT – IV

8. (a) Explain in detail various Internet services and MIME-Types. 8

(b) Write short notes on : 8

(i) multimedia on the web

(ii) web servers

9. Explain following : $4 \times 4 = 16$

(a) Site builders and plug-ins

(b) HTML

(c) Photoshop

(d) Internetworking

22706

Foundation Elective 2nd Semester (ECE) (CBCS Scheme) Examination – May, 2023

ELECTRONICS ENGINEERING

Paper : 16ECEF1

Time : Three Hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Draw VI characteristics of an ideal diode. 2

(b) Define transistor. 2

(c) What is Pinch-off voltage ? 2

(d) What is LATCH circuit ? 2

SECTION – A

2. Discuss PN Junction as rectifier. Give formulas of PIV, V_{dc}, I_{dc}, efficiency and peak factor for half wave rectifier. 8

3. Explain voltage multiplier circuits. 8

SECTION – B

4. Prove that $r = \frac{1}{1-\alpha} = 1+\beta$ 8

5. What is an operating point of transistor ? Why we need bias stability ? Explain bias compensation. 8

SECTION – C

6. Explain JFET with its constructional diagram. Drain characteristics and transfer characteristics. 8

7. What is MOSFET ? Explain enhancement type MOSFET with its drain and transfer characteristics. 8

SECTION – D

8. What are Universal Gates ? Why they are so called ? Make circuits of AND, OR and NOT Gates using Universal Gates. 8

9. (a) Differentiate between combinational and sequential circuits. 4

(b) Convert the following : 4

(i) $(468)_{10}$ = ( )$_2$

(ii) $(A4B)_{16}$ = ( )$_8$

(iii) $(431)_8$ = ( )$_{10}$

(iv) $(101.11)_2$ = ( )$_{10}$

9. Write a note on any *two* of the following : $10 \times 2 = 20$

(a) Energy conservation measures

(b) UPS

(c) Voltage stabilizers

Roll No. .....

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M. Tech. 2nd Semester (Power System) (Elective-I) Examination – June, 2023

ENERGY AUDITING AND MANAGEMENT

Paper : 22MPS22D1

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Students have to attempt ***one*** question from each Section. Question No. 1 is ***compulsory***.

1. (a) Write down the role of energy managers.

(b) Write down about the scope of energy auditing in industries.

(c) What are the benefits of auditing electrical equipment ?

(d) How voltage stabilizers are significant in energy conservation ? $5 \times 4 = 20$

SECTION – A

2. (a) Write a note on energy scenario. 10

(b) Enlist various demand forecasting techniques. Explain any *two*. 10

3. (a) Name and explain various DSM techniques and methodologies. 10

(b) Explain energy audit and metering in energy management. 10

SECTION – B

4. Explain various energy audit concepts including numerous basic elements and measurements in it. 20

5. (a) What are the different evaluation and instrumentation techniques ? 10

(b) Write about various energy management devices. 10

SECTION – C

6. (a) How energy conservation opportunities can be evaluated ? 10

(b) Write various steps involved in preparation of energy audit report. 10

7. How energy audit can be carried out in various instruments like motors, transformers, cables, pumps etc ? 20

SECTION – D

8. (a) How energy conservation is carried out in thermal power plants ? 10

(a) How energy can be conserved in electric devices ? 10

23763

M. Tech. 2nd Semester (Power System) Examination – June, 2023

ADVANCED POWER SYSTEM PROTECTION

Paper : 22MPS22C1

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is ***compulsory*** of short answer and attempt ***four*** questions by selecting ***one*** question from each Section. All questions carry equal marks.

1. (a) Mention some causes for relay failures.

(b) What is Protective relay ?

(c) What do you mean by inverse time OC relays ?

(d) How the electrical Power system protection is divided ?

(e) What are the different types of principles of operation of Electromechanical relays ?

SECTION – A

2. (a) Explain the need of protective system.

(b) Explain distance relay with neat diagram.

3. Classify and explain different protective relays with schematic diagram.

SECTION – B

4. (a) Describe the Principle of sampling comparators.

(b) Explain analysis of amplitude comparator.

5. Explain Rectifier bridge circulating and opposed voltage type amplitude comparators with necessary diagram.

SECTION – C

6. Write technical notes on following :

(a) Translay Scheme

(b) Circulating current scheme

7. (a) Explain static distance relay.

(b) Discuss carrier current protection.

SECTION – D

8. Describe the realization of a directional over currer relay using Microprocessor.

9. Write short notes on following :

(a) Numerical protection

(b) Microprocessor based over current relays

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M. Tech. 2nd Semester (Power System) Examination – June, 2023

MICRO GRID AND ENERGY STORAGE SYSTEM

Paper : 22MPS22C2

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is ***compulsory*** of short answer and attempt *four* questions by selecting *one* question from each Section. All questions carry equal marks.

1. (a) What do you mean by micro Grid drivers ?

   (b) Mention different protection issues in Micro Grid.

   (c) Explain different methods of energy storage.

(d) Differentiate battery and fuel cell.

(e) What do you mean by smart Grid ?

SECTION – A

2. (a) Explain typical structure and configuration of a Micro grid.

(b) Differentiate AC and DC Micro grids.

3. Explain Power electronics interfaces in DC and AC Micro grids in detail.

SECTION – B

4. (a) Explain the active and reactive power control in control of Micro grid.

(b) Explain different Protection issues in Micro grid.

5. Explain different communication based techniques used in operation and control of Micro grid.

SECTION – C

6. Explain different energy storage technologies in detail.

7. (a) Explain electromechanical techniques used for energy storage.

(b) Write short note on efficiency of energy storage system.

SECTION – D

8. (a) Describe about Hydrogen production and storage.

(b) Explain the energy storage concept of batteries.

9. Write technical notes on following :

(a) V2G

(b) SMES