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<b>R-17</b>
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**Code: 7G264**

III B.Tech. II Semester Supplementary Examinations May/June 2022

**Power System Analysis**

(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks

**UNIT-I**

- 1. a) What are the different elements in the power system network? 7M
- b) Define the terms i) Graph ii) Sub-graph iii) Tree iv) Co-tree v) Branch vi) Link vii) Cut set 7M

**OR**

- 2. a) Derive the necessary expressions for building up of Z-bus when New element is added to Reference 7M
- b) Derive the necessary expressions for building up of Z-bus when New element is added between New bus to old bus 7M

**UNIT-II**

- 3. Derive and explain about static load flow equations. 14M

**OR**

- 4. Explain with a neat flow chart for Gauss-Seidel method without PV buses 14M

**UNIT-III**

- 5. a) Define per unit system and write an equation for new base impedance? 7M
- b) Draw the Per Unit equivalent reactance network of a three-phase power system consisting of a generator, transmission line, transformer, and motor. 7M

**OR**

- 6. Discuss the principle of symmetrical components. Derive the necessary equations to convert: 14M
  - (i) Phase quantities into symmetrical components.
  - (ii) Symmetrical components into phase quantities.

**UNIT-IV**

- 7. a) What is stability? Explain different types of stabilities. 7M
- b) What is steady state stability and define steady state stability limit. 7M

**OR**

- 8. A 50Hz, 4 pole turbo alternator rated 100MVA, 11KV has an inertia constant of 8MJ/MVA. Find: 14M
  - (i) The energy stored in the rotor at synchronous speed.
  - (ii) The rotor acceleration if the mechanical input is suddenly raised to 80MW for an electric load 50MW

**UNIT-V**

- 9. Explain the Factors effecting the Transient stability. 14M

**OR**

- 10. What is equal area criterion? Interpret this for a case when there is a sudden short circuit at one end of one of the line of parallel lines. 14M

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<b>R-17</b>
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**Code: 7G261**

III B.Tech. II Semester Supplementary Examinations May / June 2022

**Power System Operation and Control**

(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks

**UNIT-I**

1. a) Incremental fuel costs in Rs/MWh for 2 units in a plant are given by  
 $dc1/dp1 = 0.15P1 + 25$ ,  $dc2/dp2 = 0.12P2 + 15$ .  
The minimum and maximum loads on each unit are to be 20MW and 125 MW respectively. Determine IFC and allocation of load between units for the minimum cost and load is 150MW. Assume both the units are operating. 8M
- b) Derive the coordination equation without losses? 6M

**OR**

2. a) Explain the need of economic load dispatch for a given power system 4M
- b) Derive the transmission loss formula for a system consisting of n-generating plants supplying several loads inter connected through a transmission networks. State any assumptions are made. 10M

**UNIT-II**

3. With flowchart, explain the dynamic programming method to solve unit commitment problem. 14M

**OR**

4. a) Explain the hydro- thermal scheduling 7M
- b) Write about incremental production costs for hydro power plants. 7M

**UNIT-III**

5. a) Draw the block diagram representation of IEEE type 1 excitation system model 7M
- b) Explain the block diagram representation of an isolated power system with diagram. 7M

**OR**

6. a) Derive the first order turbine model. Represent the model in block diagram. 7M
- b) Describe various elements that are to be considered in modeling of an excitation system 7M

**UNIT-IV**

7. Explain LFC of a Two area system in both uncontrolled case and controlled case 14M

**OR**

8. a) Draw the LFC block diagram of an isolated power system. Write the dynamic response curve of change in frequency for a step change in load. 7M
- b) Derive the expression for change in tie line power and draw its block diagram? 7M

**UNIT-V**

9. a) Write the various objectives of series and shunt compensation 6M
- b) Explain the uncompensated and compensated transmission lines. 8M

**OR**

10. a) Describe the effect of connecting series capacitors in the transmission system. 6M
- b) Explain over voltages on sudden loss of loads. And also List out various loads which require compensation. 8M

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<b>R-17</b>
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**Code: 7G263**

III B.Tech. II Semester Supplementary Examinations May/June 2022

**Switch Gear and Protection**  
(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks

**UNIT-I**

1. a) Describe the construction and operation of the HRC cartridge fuse. 7M  
b) Explain the terms restriking voltage, recovery voltage and RRRV 7M

**OR**

2. a) Explain the following terms 7M  
i) Minimum fusing current ii) Fusing factor iii) Prospective current  
b) A circuit breaker is rated as 2500A, 1500MVA, 33KV, 3secs, 3 -phase oil C.B. Determine the rated symmetrical breaking current, rated making current and short time rating. 7M

**UNIT-II**

3. a) Derive an expression for torque produced by an induction relay 9M  
b) List out different types of electromagnetic relays. 5M

**OR**

4. a) Explain basic principle of operation of a differential relay. 7M  
b) Discuss the characteristics of impedance relay with help of R-X diagram. 7M

**UNIT-III**

5. a) Discuss the protection of inter turn fault in an alternator with help of neat diagram. 8M  
b) A three phase transformer of 220/11,000 line volts is connected in star / delta. The protective transformers on 220V side have a current ratio of 600/5. What should be C.T. ratio on 11,000 v side? 6M

**OR**

6. a) Discuss the protection employed against loss of excitation of an alternator. 6M  
b) With a neat sketch explain the working of a Buchholz relay for transformer protection and state it's limitations. 8M

**UNIT-IV**

7. a) Describe the application of time-graded overcurrent protection of radial and parallel feeder systems. 7M  
b) Explain the zonal protection scheme for feeder. Describe the reactance relay characteristic for 3-zone protection. 7M

**OR**

8. a) Discuss the demerits of differential overcurrent protection for bus-bars and how it is overcome? 7M  
b) Summarize the merits and demerits of various pilot wire protection schemes for protection of transmission lines. 7M

**UNIT-V**

9. a) Classify different types of neutral grounding in power system. 7M  
b) Describe the construction, Principle of operation of valve type lightning arresters. 7M

**OR**

10. a) Derive the expression for the reactance of the Peterson coil. 7M  
b) Discuss briefly a surge absorber and explain about Ferranti surge absorber. 7M

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**Code: 7G265**

III B.Tech. II Semester Supplementary Examinations May/June 2022

**Utilization of Electrical Energy**  
(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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- |  | Marks |
|--|-------|
| <b>UNIT-I</b>  |       |
| 1. a) What is an electric drive? Classify various types of Electric drives?  | 7M    |
| b) Discuss various factors which affect the selection of motor for a particular drive?   | 7M    |
| <b>OR</b>  |       |
| 2. a) What are the relative advantages and disadvantages of DC and AC electric drives?   | 7M    |
| b) Discuss how the type and size of motors for intermittent loads is determined.   | 7M    |
| <b>UNIT-II</b>   |       |
| 3. a) Explain why very high frequencies should not be used for dielectric heating  | 7M    |
| b) Describe various types of electric arc welding processes?   | 7M    |
| <b>OR</b>  |       |
| 4. a) Explain the causes of failure of heating elements.   | 7M    |
| b) A 4.5-kW, 200-V, and 1- resistance oven is to have nichrome wire heating elements. If the wire temperature is to be 1,000°C and that of the charge 500°C. Estimate the diameter and length of the wire. The resistivity of the nichrome alloy is 42.5 μ -m. Assume the radiating efficiency and the emissivity of the element as 1.0 and 0.9, respectively. | 7M    |
| <b>UNIT-III</b>  |       |
| 5. a) Differentiate between tungsten filament lamps and fluorescent lamps  | 7M    |
| b) The illumination at a point on a working plane directly below the lamp is to be 60lumens/m <sup>2</sup> . The lamp gives 130 CP uniformly below the horizontal plane. Determine:<br>(i) The height at which lamp is suspended.<br>(ii) The illumination at a point on the working plane 2.8 m away from the vertical axis of the lamp.                      | 7M    |
| <b>OR</b>  |       |
| 6. a) What is flood lighting and where it is used? Explain briefly the principles employed in the design of flood lighting installations.  | 7M    |
| b) Two sources of candle power or luminous intensity 200 candela and 250 candela are mounted at 8 and 10 m, respectively. The horizontal distance between the lamp posts is 40 m, calculate the illumination in the middle of the posts.   | 7M    |
| <b>UNIT-IV</b>   |       |
| 7. a) Define the term specific energy consumption and discuss the factors which affect the specific energy consumption of trains operating at a given schedule speed.  | 7M    |
| b) An electric train has an average speed of 50 kmph on a level track between stops 1,500m apart. It is accelerated at 2 kmphs and is braked at 3 kmphs. Estimate the energy consumption at the axle of the train per ton-km. Take the reactive resistance constant at 50 N/ton and allow 10% for rotational inertia.  | 7M    |
| <b>OR</b>  |       |
| 8. a) The speed time curve of train carries of the following parameters:<br>(i) Free running for 12 min.<br>(ii) Uniform acceleration of 6.5 kmph for 20 s.<br>(iii) Uniform deceleration of 6.5 kmph to stop the train.<br>(iv) A stop of 7 min.<br>Then, determine the distance between two stations, the average, and the schedule speeds.                  | 7M    |
| b) Derive the relationship between acceleration, retardation, maximum speed, running time and distance between two stops assuming trapezoidal speed time curve.  | 7M    |
| <b>UNIT-V</b>  |       |
| 9. a) Explain the principle, working of electric vehicles  | 7M    |
| b) Explain the power flow control in hybrid drive-train topologies   | 7M    |
| <b>OR</b>  |       |
| 10. a) Summarize the challenges faced by electric vehicle technology   | 7M    |
| b) Explain the environmental benefits of Solar Powered Charging Stations   | 7M    |

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**R-17**

**Code: 7G262**

III B.Tech. II Semester Supplementary Examinations May/June 2022

**Microprocessors and Microcontrollers**

(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks

**UNIT-I**

1. With a neat sketch explain in detail the internal hardware architecture of 8086 microprocessor. 14M

**OR**

2. a) Describe about the signals involved in minimum mode operation of 8086 microprocessor based system with the timing diagram. 7M

b) Explain about the following assembler directives: ENDP, EQU, EVEN, EXTRN with examples. 7M

**UNIT-II**

3. a) Compare memory mapped I/O and I/O mapped I/O. 7M

b) What is the need of DMA in microprocessor applications? Explain in brief about data transfer modes of DMA. 7M

**OR**

4. a) Discuss the following methods of data transfers (i) Polling (ii) Interrupt driven 7M

b) The DMA controlled data transfers are faster than the polling and Interrupt driven data transfers". Justify 7M

**UNIT-III**

5. a) Compare synchronous and asynchronous data communications 7M

b) Write short note on different data transfer methods 7M

**OR**

6. a) Distinguish between half duplex and full duplex data transmission 7M

b) Discuss the command instruction and status register formats of 8251. 7M

**UNIT-IV**

7. With neat sketch explain the architecture/ functional block diagram of 8051 microcontroller. 14M

**OR**

8. a) Explain TCON and TMOD SFR for 8051 Microcontroller 7M

b) Write an assembly program to multiply two 16-bit numbers for 8051 controller. 7M

**UNIT-V**

9. a) Differentiate ARM and THUMB instruction set 7M

b) Discuss the instruction set available in ARM Controllers with example 7M

**OR**

10. a) Explain the features and applications of ARM7 microcontroller 7M

b) Explain the PWM controller features in available ARDUINO microcontroller. 7M

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Hall Ticket Number :

**R-17**

**Code: 7G16D**

III B.Tech. II Semester Supplementary Examinations May/June 2022

**Object Oriented Programming Concepts**

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks

**UNIT-I**

- 1. Explain the following Concepts with suitable syntaxes & examples. 14M
  - i. Class
  - ii. Object
  - iii. Pointer
  - iv. Array
  - v. Destructor

**OR**

- 2. a) What is an array? How arrays are declared and initialized? Explain with examples. 7M
- b) Explain the features of Object Oriented Programming and mention the benefits of OOP over structured programming. 7M

**UNIT-II**

- 3. a) Write short notes on followings. 8M
  - i. friend Function
  - ii. virtual function
- b) What is operator overloading? Write a program to overload the + operator. 6M

**OR**

- 4. a) Explain the conditional statements in detail. 8M
- b) Explain 'this' pointer with an example program. 6M

**UNIT-III**

- 5. a) Define Class & Object in Java? Explain with suitable example. 7M
- b) Write a java program to print first N Fibonacci Series using While loop. 7M

**OR**

- 6. a) Write the structure of java program. 6M
- b) Mention the five types of tokens in Java. Explain the derived data types in Java. 8M

**UNIT-IV**

- 7. a) What are exceptions in Java? Write about the common exceptions that occur in Java. 7M
- b) What is meant by inheritance? How can you achieve multiple-inheritance in Java 7M

**OR**

- 8. a) Discuss the process of throwing own exceptions in java. 8M
- b) Explain the various access specifiers are used in java. 6M

**UNIT-V**

- 9. a) Define Applet. Write a java program to create simple Applet in java. 7M
- b) What is multithreading? Explain the process of creation of a thread in java. 7M

**OR**

- 10. a) What are the stages in Thread life cycle? Explain them in detail. 8M
- b) Write short note on Streams in java. 6M

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