

Hall Ticket Number :

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R-19

Code: 19A261T

III B.Tech. II Semester Supplementary Examinations April 2023

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)

UNIT-I

Marks CO BL

1. With a neat block diagram explain the architecture of 8086 in minimum mode operation and also explain the timing diagram for input and output transfer on a minimum mode 14M CO1 L2

OR

2. a) Draw the pin diagram of 8086 microprocessor and explain the functions of the following pins. 7M CO1 L2
(i) ALE (ii) NMI (iii) INTR (iv) HOLD (v) HLDA (vi) BHE (vii) LOCK
b) What is a procedure? What are different types of procedures in 8086? Discuss each type of procedure with examples. 7M CO1 L1

UNIT-II

3. a) Explain how an ADC can be interfaced with 8086 microprocessor 7M CO2 L2
b) Explain how the stepper motor can be interfaced with 8086 microprocessor. 7M CO2 L2

OR

4. a) Explain the function of Programmable Peripheral Interface PPI in detail with the help of block diagram. 7M CO2 L2
b) Draw and discuss the architecture of 8257 DMA controller? 7M CO2 L3

UNIT-III

5. Explain 8251 UART Architecture and its functionality. 14M CO3 L2

OR

6. a) Draw the circuit of TTL to RS-232 and explain the necessity of this interface. 7M CO3 L2
b) Discuss the overrun error and framing error with reference to 8251 7M CO3 L2

UNIT-IV

7. Describe the functions of various pins of 8051 microcontroller with pin diagram. 14M CO4 L2

OR

8. a) What is the difference between the Microprocessors and Microcontrollers? 7M CO4 L2
b) Explain the I/O pin ports and circuit details of 8051 microcontroller 7M CO4 L2

UNIT-V

9. a) Explain in detail about ARM micro controller features and applications 7M CO5 L2
b) Discuss about ARM 7 and ARM 9 microcontrollers 7M CO5 L2

OR

10. a) Explain the operation of BL instruction. Also mention the state of ARM registers 7M CO5 L2
b) List the special features of ARM controller design 7M CO5 L1

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.

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III B.Tech. II Semester Supplementary Examinations April 2023

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)

Marks CO BL

UNIT-I

1. a) The fuel input per hour of plant 1 and 2 are given as
 $C_1 = 0.2P_1^2 + 40P_1 + 120$ Rs/h $C_2 = 0.25P_2^2 + 30P_2 + 150$ Rs/h
Determine the economic operating schedule and the corresponding cost of generation if the max and min loading on each unit is 100MW and 25MW, the demand is 180 MW and transmission losses are neglected. If the load is equally shared by both the units, determine the saving obtained by loading the units as per equal incremental production cost. 8M 1 3
- b) What is a penalty factor in economic scheduling? Give its significance. 6M 1 1
- OR**
2. a) Explain various factors to be considered in allocating generation to different power stations for optimum operation. 8M 1 1
- b) A system consists of two generating plants with fuel costs of:
 $C_1 = 0.03P_1^2 + 15P_1 + 1.0$ $C_2 = 0.04P_2^2 + 21P_2 + 1.4$
The system operates on economic dispatch with 120MW of power generation by each plant. The incremental transmission loss of plant-2 is 0.15. Find the penalty factor of plant-1. 6M 1 3

UNIT-II

3. a) Derive the coordination equation for the optimal scheduling of hydrothermal interconnected power plants. 8M 1 6
- b) Explain optimal power flows. 6M 1 2
- OR**
4. Explain and write the mathematical formulation for optimal scheduling of Hydro thermal system. Explain any one solution technique of solving equations with the help of an algorithm 14M 1 2

UNIT-III

5. a) Obtain the transfer function and block diagram representation of First order turbine model 7M 3 2
- b) Draw the schematic diagram of a speed governing system and explain the functioning of its components. Also obtain the mathematical model. 7M 3 4
- OR**
6. a) Derive the transfer function of a single area system with a block diagram. 7M 3 6
- b) Explain the flat frequency control. 7M 3 1

UNIT-IV

7. a) Explain the LFC of an Isolated power system 8M 2 1
- b) Two Turbo-alternators rated for 110 MW and 210 MW have governor droop characteristic of 5% from No load to Full load. They are connected in parallel to share a load of 250 MW. Determine the load shared by each machine assuming free governor action. 6M 2 3
- OR**
8. a) Write the state space representation of AGC for single area. 7M 2 1
- b) How does load frequency control is achieved by considering economic dispatch. 7M 2 1

UNIT-V

9. a) Explain the reasons for variation of voltages in power systems and explain any one method to improve voltage profile 7M 3 1
- b) Derive the relation between reactive power flow and the voltage of bus. 7M 3 6
- OR**
10. a) Describe the performance of uncompensated transmission lines. 7M 3 1
- b) Describe the constructional features of a synchronous capacitor. Explain its operation and discuss various applications in power system operation. 7M 3 1

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III B.Tech. II Semester Supplementary Examinations April 2023

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)

Marks CO BL

UNIT-I

1. a) State the advantages and disadvantages of electric drive over mechanical drive 7M CO1 L3
- b) Explain the following loads with suitable examples.
(i) Continuous (ii) Intermittent (iii) Variable 7M CO1 L3

OR

2. a) A 500-V DC series motor runs at 500 rpm and takes 60 A; the resistances of the field and the armature are 0.3 and 0.2 Ω , respectively. Calculate the value of the resistance to be shunted with series field winding in order that the speed may be increased to, 600 rpm, if the torque were to remain constant. Saturation may be neglected. 7M CO1 L2

UNIT-II

3. a) What are the different methods of electric heating? Describe briefly the methods of direct and indirect resistance? 14M CO2 L3

OR

4. a) Derive an expression for heat produced in a dielectric material. Discuss the factors influencing the dielectric heating 7M CO2 L3
- b) Which type of DC generator is best suitable for electric welding? Justify your answer. 7M CO2 L3

UNIT-III

5. a) Explain the design procedure for good lighting system. 7M CO3 L3
- b) A room with an area of 6 \times 9 m is illustrated by ten 80-W lamps. The luminous efficiency of the lamp is 80 lumens/W and the coefficient of utilization is 0.65. Find the average illumination. 7M CO3 L3

OR

6. a) Describe with a circuit diagram the working of a fluorescent lamp. Enumerate its advantages and disadvantages 7M CO3 L3

- b) The candle power of a source is 200 candela in all directions below the lamp. The mounting height of the lamp is 6 m. Find the illumination:
- Just below the lamp.
 - 3 m horizontally away from the lamp on the ground.
 - The total luminous flux in an area of 1.5-m diameter around the lamp on the ground.

7M CO3 L3

UNIT-IV

7. a) Explain why a DC series motor is ideally suited for traction purposes?
- b) A train weighing 450 ton is going down a gradient of 20 in 1,000, it is desired to maintain train speed at 50 kmph by regenerative braking. Calculate the power fed into the line and allow rotational inertia of 12% and the efficiency of conversion is 80%. Traction resistance is 50 N/ton.

7M CO4 L3

7M CO4 L3

OR

8. a) An electric train of weight 250 ton has eight motors geared to driving wheels, each is 85 cm diameter. The tractive resistance is of 50/ton. The effect of rotational inertia is 8% of the train weight, the gear ratio is 4-1, and the gearing efficiency is 85% determine. The torque developed by each motor to accelerate the train to a speed of 50 kmph in 30 s up a gradient of 1 in 200.
- b) A locomotive exerts a tractive effort of 35,000 N in halting a train at 50 kmph on the level track. If the motor is to haul the same train on a gradient of 1 in 50 and the tractive effort required is 55,000 N, determine the power delivered by the locomotive if it is driven by (i) DC series motors and (ii) induction motors.

7M CO4 L3

7M CO4 L3

UNIT-V

9. a) Explain the design of hybrid vehicles
- b) Describe the terms which decides the performance of electric vehicles
10. a) Explain different types of electric vehicles
- b) Explain different battery technologies available for electric vehicles

7M CO5 L3

7M CO5 L3

7M CO5 L5

7M CO5 L5

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III B.Tech. II Semester Supplementary Examinations April 2023

Fundamentals of HVDC & FACTS Devices

(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)

		Marks	CO	BL
UNIT-I				
1.	Draw the layout of a HVDC converter station and briefly discuss about various components present.	14M	1	2
OR				
2.	Derive the expression for average output voltage of 3- phase bridge converter with neat waveforms assuming that there is no overlap.	14M	1	3
UNIT-II				
3.	Explain the constant extinction angle control and constant current control?	14M	2	2
OR				
4.	Draw converter control characteristics and explain why it is desirable to have current control at rectifier station and CEA control at inverter station?	14M	2	2
UNIT-III				
5.	Explain the sequential method of AC/DC power flow. Draw the necessary flow chart.	14M	3	2
OR				
6.	Explain briefly basic types of FACTS controllers?	14M	3	2
UNIT-IV				
7.	Explain the principle of operation of STATCOM with neat diagram?	14M	4	2
OR				
8.	Explain improvement of voltage profile and power oscillation damping using series compensation?	14M	4	2
UNIT-V				
9.	Explain briefly the operating modes of UPFC?	14M	4	2
OR				
10. a)	Explain the basic operating principle of UPFC?	7M	4	2
b)	Explain how the UPFC can control real and reactive power flow in the transmission line	7M	4	2
