Code: 19A261T

III B.Tech. II Semester Supplementary Examinations December 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	CO	Blooms Level
		UNIT–I			
1.	a)	Illustrate the various addressing modes in 8086 along-with appropriate examples.	8M	CO1	L2
	b)	Explain the different flags available in 8086 along with the flag register.	6M	CO1	L2
		OR			
2.	a)	Discuss various functions performed by 8086 Microprocessor.	7M	CO1	L3
	b)	What do you mean by Instruction Cycle, Machine cycle and T-state? Draw the timing diagram.	7M	CO1	L2
		UNIT–II			
3.	a)	Draw the block diagram of 8255 and explain its operation.	9M	CO2	L3
	b)	Give Interrupt structure of 8086.	5M	CO2	L1
		OR			
4.	a)	Sketch and explain the architecture of 8257 Controller in detail.	8M	CO2	L3
	b)	Draw the block diagram of 8259 and explain the function of each block.	6M	CO2	L4
		UNIT–III			
5.	a)	Write a short note on RS-232C.	7M	CO3	L1
	b)	Explain USART architecture.	7M	CO3	L3
		OR			
6.	a)	Discuss various serial communication interfaces.	7M	CO3	L2
	b)	Describe TTL to RS232C conversion.	7M	CO3	L3
		UNIT–IV			
7.	a)	Analyze the architecture of 8051 microcontroller along-with a suitable block diagram	8M	CO4	L4
	b)	Analyze the process of serial communication in 8051 and also discuss the SFR's used in serial communication	6M	CO4	L4
		OR			
8.	a)	Illustrate the addressing modes of 8051 microcontroller. Support your answer with suitable examples.	8M	CO4	L3
	b)	Discuss the interrupts of 8051.	6M	CO4	L2
		UNIT–V			
9.	a)	What are various types of Microcontrollers with their specifications?	8M	CO5	L2
	b)	Justify how ARM instruction set is suitable for embedded applications.	6M	CO5	L4
		OR			
10.	a)	What is ARM microcontroller and where ARM Chips are used?	7M	CO5	L3
	b)	Explain Architecture of ARDUANO System.	7M	CO5	L2

END

R-19

Code: 19A262T

III B.Tech. II Semester Supplementary Examinations December 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) Explain the need of economical load dispatch for a given power system.   7M

    b) Explain optimal allocation of generation among thermal units when line losses are neglected.   7M

OR

2. a) Explain optimum operation of generators using penalty factor approach.   7M

    b) For a two bus system, if a load of 125 MW is transmitted from plant to the load located at bus 2, a loss of 15.625 MW is incurred. Determine the generation schedule and the load demand if the cost of received power is Rs. 24 per MWhr. Solve the problem using co-ordination equation and penalty factor approach. The incremental production costs of the plants are: $dF_1/dP_1 = 0.025P_1 + 15$ $dF_2/dP_2 = 0.05P_2 + 20$.   7M

UNIT–II

3. What do you mean by unit commitment problem and discuss various constraints related to UCP.   14M

OR

4. a) Explain the hydro thermal economic load scheduling. Derive the necessary equations.   7M

    b) Draw and explain different hydroelectric plant models.   7M

UNIT–III

5. a) Derive the mathematical modeling of Load frequency control of a single area system.   7M

    b) Write short notes on control area concept and area control error.   7M

OR

6. a) By making suitable assumptions, derive the Transfer Function of generator load and draw its block diagram.   7M

    b) Derive small signal transfer function of Load frequency control of a single area system.   7M

UNIT–IV

7. a) Explain with block diagram the load frequency control of 2 area system.   7M

    b) Explain the response of PI on load frequency control of a uncontrolled power system.   7M

OR

8. a) What is the necessity of keeping frequency constant?   7M

    b) An isolated power system has the following parameters
        Generator inertia constant = 5 seconds
        Governor time constant = 0.2 seconds
        Turbine time constant = 0.5 seconds
        Governor speed regulation = 0.05 per unit
        The load varies by 0.8 % for a load 1 % change in frequency, i.e., B = 0.8. The turbine rated output is 250 MW at a nominal frequency of 60 Hz. A sudden load change of 50 MW occurs in the system. Find steady frequency deviation in Hz.   7M

UNIT–V

9. a) Explain briefly about the shunt and series compensation of transmission systems.   7M

    b) Write the specifications of load compensator.   7M

OR

10. a) Discuss how the reactive power compensation is done in transmission systems.   7M

    b) What are the merits and demerits of different types of compensation?   7M

END

III B.Tech. II Semester Supplementary Examinations December 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	CO	Blooms Level

UNIT–I

1. A three-phase alternator has the line voltage of 11kV. The generator is connected to a circuit breaker. The inductive reactance upto the circuit breaker is 5ohms/ph. The distributed capacitance upto circuit breaker between phase and neutral is 0.01µF. Neglect first pole to clear factor. Determine the following: i) Peak restriking voltage across CB ii) Frequency of restriking voltage transient iii) Average rate of restriking voltage upto peak restriking voltage iv) Maximum RRRV — **14M · 1 · 3**

OR

2. a) Explain the phenomenon of transient recovery voltage and its influence on the behavior of circuit breaker performance? — **7M · 1 · 2**

   b) Explain briefly the arc extinction process in SF_6 circuit breaker? — **7M · 1 · 2**

UNIT–II

3. a) Describe the principle of impedance type distance relay? — **7M · 2 · 2**

   b) What do you understand by amplitude comparator and phase comparator? Prove the duality between them with the help of phasor diagram? — **7M · 2 · 2**

OR

4. a) An IDMT relay operates in 5 seconds for PSM's of 4 and 10 respectively. The relay is used to protect a feeder through a 1000/5 A CT. Calculate the time of operation of the relay when the feeder current is 1500A. The relay has a plug setting of 75% and time setting of 0.4. The nominal current rating of the relay is 5A. — **7M · 2 · 3**

   b) Why a biased differential relay is preferred over a simple differential relay? Make a list of application of a biased differential relay? — **7M · 2 · 2**

UNIT–III

5. a) Discuss the different transformer faults. What are the various protection schemes available for transformer? 7M 3 1

   b) Explain the operation of Buchholz relay? 7M 3 1

OR

6. The neutral point of a three-phase 20MVA, 11kV alternator is earthed through a resistance of 5 ohms, the relay is set to operate when there is an out-of balance current of 1.5A. The Cts have a ratio of 1000/5. What is the percentage of winding protected? Also calculate the earthing resistance required to protect 90% of the winding? 14M 3 3

UNIT–IV

7. a) How earth fault protection is achieved in case of feeders? Explain with sketches? 7M 4 2

   b) Explain a scheme of protection of ring main? 7M 4 2

OR

8. a) Discuss the merits and demerits of various pilot-wire relaying schemes for protecting transmission lines? 7M 4 2

   b) What are the advantages of distance protection over other types of protection of feeders? 7M 4 2

UNIT–V

9. a) Why is insulation coordination required in a large power system? What is meant by BIL of equipment? 7M 4 2

   b) Explain the phenomenon of arcing ground and suggest some method to minimize the effect of this phenomenon? 7M 4 2

OR

10. Derive an expression for the reactance of the Peterson coil in terms of the capacitance of the protected line. Calculate the reactance of a coil suitable for 33 kV, 3-phase transmission system of which the capacitance to earth of each conductor is 5µF. 14M 4 3

END

Code: 19A26CT

III B.Tech. II Semester Supplementary Examinations December 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	CO	Blooms Level

UNIT–I

1. a) Explain the parameters for Selection of electrical drives? — 7M, CO1, L1

   b) Brief about the Advantages of electrical drive? — 7M, CO1, L1

OR

2. a) Discuss the Classification of drive based on their power ratings? — 4M, CO1, L1

   b) Discuss the Types of industrial loads about Continuous, Intermittent and Variable loads? And explain Load equalization in drives? — 10M, CO1, L1

UNIT–II

3. a) Discuss various methods of controlling temperature in resistance and Dielectric heating? — 7M, CO2, L2

   b) Explain various applications of Electric welding? — 7M, CO2, L2

OR

4. a) What are the characteristics of projection welding and Applications of Projection welding? — 7M, CO2, L2

   b) Explain the factors which limit the choice of frequency in induction and dielectric heating? — 7M, CO2, L2

UNIT–III

5. a) A lamp taking 3.5A at 100V emits 6000 lumens. Calculate its efficiency in
   i) Lumens per watt
   ii) Mean spherical candle power per w — 7M, CO3, L3

   b) State the comparisons between filament lamp and fluorescent tube — 7M, CO3, L3

OR

6. a) Explain about Fluorescent lamp with neat sketch? — 7M, CO3, L3

b) A lam of 200w having an MSCP of 400 is suspended above a working surface. Calculate
   i) Illumination directly below the lamp
   ii) Lamp efficiency   7M CO3   L3

UNIT–IV

7. a) For a quadrilateral speed-time curve of an electric train, derive expression for the distance between stops and speed at the end of coasting period?   7M CO4   L1

   b) Explain the structure of locomotive in brief?   7M CO4   L1

OR

8. a) What do you understand by tractive effort? Derive an expression for the same?   7M CO4   L1

   b) Discuss the advantages of Electric traction in detail?   7M CO4   L1

UNIT–V

9. a) Discuss about HEV Fundamentals and their Advantages and Disadvantages?   7M CO5   L2

   b) Brief the Types of vehicle chargers-Benefits of electric vehicle?   7M CO5   L2

OR

10. a) Brief about working of Working of EVs and Electrical Machines used for EVs?   7M CO5   L2

   b) Differences between IC engine vehicles and Electric vehicle?   7M CO5   L2

END

Code: 19A26ET

III B.Tech. II Semester Supplementary Examinations December 2022
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)
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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Compare advantages and disadvantages of HVAC transmission with that of HVDC transmission?	7M	1	2
	b)	Draw the schematic diagram of HVDC Converter station and explain the function of each component?	7M	1	1
		OR			
2.		Draw a schematic of a 6-pulse converter circuit and derive from fundamentals, the expression for voltage and currents for the operation of convertor as a rectifier and inverter with relevant waveforms	14M	1	1
		UNIT–II			
3.	a)	Explain CEA control in HVDC converter system?	7M	2	2
	b)	Explain the use of shunt compensation elements in HVDC system?	7M	2	2
		OR			
4.	a)	What are the different types of filters used on the AC side of an HVDC system? How are they located and arranged?	7M	2	2
	b)	Write a brief note on characteristic and non- characteristic harmonics?	7M	2	3
		UNIT–III			
5.	a)	Explain about simultaneous method of power flow analysis?	7M	3	2
	b)	Describe the need for FACTS controllers in a widely interconnected power system.	7M	3	2
		OR			
6.	a)	Explain about sequential method of power flow analysis?	7M	3	2
	b)	What are the basic types of FACTS controllers, explain them in short	7M	3	3
		UNIT–IV			
7.		Give the main objectives of series compensation and also explain about the series capacitive compensation in power system with a corresponding Phasor diagram.	14M	4	2
		OR			
8.	a)	Draw the power angle characteristics of a two-machine system with and without shunt compensation. Explain briefly.	7M	4	4
	b)	How the transient stability of a system can be improved by using shunt compensation?	7M	4	4
		UNIT–V			
9.	a)	Explain the basic operating principle and the control capability of UPFC?	7M	5	2
	b)	Explain the comparison between UPFC and series compensators?	7M	5	
		OR			
10.		Explain how the UPFC can control real and reactive power flow in the transmission line.	14M	5	2

END