EEE

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 8002

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – April / May 2023
Eighth Semester
Electrical and Electronics Engineering
U19EEE24 – SMART GRID TECHNOLOGIES
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is the self-healing property of smart electric grid?	2	K1	CO1
2.	Highlight the functions of India Smart Grid Forum.	2	K2	CO1
3.	List the components of wide area monitoring system.	2	K1	CO2
4.	Identify the components of GIS in smart electric grid.	2	K2	CO2
5.	Interconnect the major elements to develop generic phasor measurement unit (PMU).	2	K2	CO3
6.	Highlight the benefits of smart metering infrastructure.	2	K1	CO3
7.	Identify the available communication media for WAMS in the smart electric grid.	2	K3	CO4
8.	Explore the application offered by NAN.	2	K3	CO4
9.	Define power quality as per IEEE and European standards.	2	K1	CO5
10.	Identify the device for improving PQ in the system.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	i. Define smart electric grid as per IEEE standard and explore the characteristics of smart grid.	6	K1	CO1
		ii. Discuss the major smart grid initiatives under taken in India by Government and other organizations.	7	K2	
		(OR)			
	b)	i. Elaborate the electrical, information and communication technologies required to build smart grid.	10	K1	CO1
		ii. Identify key challenges noticed in the development of smart electric grid.	3	K2	
12.	a)	Design and explain the general architecture of a typical wide area monitoring, protection and control (WAMPAC) system for smart electric grid.	13	K3	CO2
		(OR)			
	b)	In detail construct the architecture of smart electric grid and highlight the role of each component with neat sketch.	13	K3	CO2
13.	a)	Explore in detail the functional operation of generic developed phasor measurement unit (PMU).	13	K2	CO3
		(OR)			
	b)	Realize the smart electric distribution network by application of IEDs with neat architect & operation.	13	K2	CO3
14.	a)	i. What is WAN and elaborate the characteristics of WAN.	4	K1	CO4
		ii. In detail explain the requirement of devices to build WAN.	9	K2	
		(OR)			
	b)	Frame the layers of internet protocol and describe the function of each layer.	13	K3	CO4
15.	a)	i. In detail specify the power quality parameters as per IEC standard.	5	K1	CO5
		ii. Explain the power quality issues in smart grid scenario.	8	K2	
		(OR)			
	b)	Describe the role of custom power devices to mitigate power quality issues of grid connected renewable energy sources.	13	K3	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Construct the 21st century substation for monitoring and protection of power grid by utilizing advanced metering infrastructure. Highlight the benefits achieved through modern automated electric substation.	15	K6	CO1
		(OR)			
	b)	Develop an appropriate optical communication platform to transfer the bulk amount of synchrophasor information from various large number of phasor measurement units (PMUs) to phasor data concentrator (PDC) located at regional load dispatch centre.	15	K6	CO5

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Question Paper Code: 8001

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – April / May 2023
Eighth Semester
Electrical and Electronics Engineering
UI19EEE20 – ELECTRICAL AND HYBRID VEHICLES
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Classify Hybrid Electric vehicles?	2	K1	CO1
2.	What are the Electrical losses in hybrid electrical vehicles?	2	K2	CO1
3.	List the factors that affects vehicle performance.	2	K1	CO2
4.	Distinguish between hybrid electric vehicles and conventional vehicles?	2	K2	CO2
5.	What is hybrid electric drive train?	2	K1	CO3
6.	Define Traction?	2	K1	CO3
7.	List out the power control strategies of electric drive train?	2	K1	CO4
8.	Draw the diagram of parallel hybrid electric drive train.	2	K2	CO4
9.	Define regenerative braking of hybrid electric vehicles.	2	K2	CO5
10.	Give the expression of braking forces on the front and rear wheels.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	What are the social impacts of hybrid electric vehicles?	13	K1	CO1
		(OR)			
	b)	i. Explain the term rolling resistance and aerodynamic drag in vehicles.	6	K2	CO1
		ii. Derive the expression for vehicle translational speed from fundamentals.	7		
12.	a)	Draw a general lay out of an EV and discuss the transmission characteristics.	13	K1	CO2
		(OR)			
	b)	Draw and explain the block diagram of switched reluctance motor drive system.	13	K2	CO2
13.	a)	Explain the series configurations of hybrid drive train with neat diagram.	13	K2	CO3
		(OR)			
	b)	Explain the vehicle performance of electric vehicles in detail.	13	K3	CO3
14.	a)	Explain the Series - Parallel configurations of hybrid drive train with neat diagram.	13	K2	CO4
		(OR)			
	b)	i. Illustrate the power flow control in hybrid electric drive train.	6	K4	CO4
		ii. Write a short note on fuel efficiency analysis in hybrid electric drive-trains.	7		
15.	a)	Explain very briefly about three different brake control strategies: series braking with optimal braking feel; series braking with optimal energy recovery; and parallel braking.	13	K2	CO5
		(OR)			
	b)	Explain with a block diagram about electronically controlled regenerative braking system functioning as an Antilock Brake System (ABS).	13	K2	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Explain the configuration of power flow control in complex hybrid control with neat diagrams.	15	K2	CO4
		(OR)			
	b)	Explain about field orientation control of induction motor drives in hybrid electric vehicles.	15	K2	CO2

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Question Paper Code: 8006

B.E. / B.Tech DEGREE END-SEMESTER EXAMINATIONS – May 2023
Sixth Semester
Electrical and Electronics Engineering
U19HS603 - PRINCIPLES OF MANAGEMENT
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 – Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define Management.	2	K1	CO1
2.	Name any two functions of Management.	2	K1	CO1
3.	List the steps in decision making process.	2	K2	CO2
4.	Distinguish between strategic planning & tactical planning.	2	K2	CO2
5.	Define span of control.	2	K1	CO3
6.	What do you mean by formal organization?	2	K1	CO3
7.	What is effective directing?	2	K2	CO4
8.	List the barriers to effective communication	2	K1	CO4
9.	List the steps in controlling.	2	K1	CO5
10.	What is the importance of coordination?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Discuss the different managerial roles in any organization.	13	K2	CO1
		(OR)			
	b)	Describe the role of values and ethics in management.	13	K2	CO1
12.	a)	Explain the planning process in detail with a relevant example.	13	K3	CO2
		(OR)			

	b)	Discuss the different tools and techniques of planning with their applicability.	13	K3	CO2
13.	a)	Explain the different forms of organizational structures prevalent in Indian organizations.	13	K3	CO3
		(OR)			
	b)	Explain the importance of recruitment & selection and training & development in any organization.	13	K3	CO3
14.	a)	Discuss any one motivation theory which you can use in your daily life?	13	K4	CO4
		(OR)			
	b)	Explain any theory of leadership that is found to be suitable in an Indian organization.	13	K4	CO4
15.	a)	Describe the various techniques of controlling with their applicability in organizations.	13	K3	CO5
		(OR)			
	b)	Which coordination technique would you prefer for effective functioning of an organization? Substantiate your answer.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Mr. Varun works as an interior designer. He gets a contract to redesign a play school. He employs three painters on the site assuming that an average painter will be able to paint 10 desks in a day. At the end of the first day of their work, Vishal finds that the painter A, B and C has painted 12, 14, 15 desks respectively. On comparing the actual performance with the planned performance, he realizes that the standard set by him is too low. Consequently, he decides to review and revise the standard and raise it. In the context of the above case, identify the function of management being performed by Varun and comment on his style.	15	K4	CO1
		(OR)			
	b)	Ms. Sunitha is heading one of the successful engineering firm in India and at pandemic times, all her employees, and herself, work from home-some from as far away from the location. When it comes time to develop ideas or projects as a team, her employees log to the Internet for a virtual meeting using an Internet chat service. If employees need to check a file, or get information on a project's progress they also sign on to the internet. All company files, including spreadsheets correspondence, and accounting ledgers are stored on a company server at an Internet service provider. In this context, discuss the challenges faced by the engineering firm in terms of organizing and coordinating.	15	K4	CO3 CO5

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Question Paper Code: 8003

B.E./ B.Tech. DEGREE END-SEMESTER EXAMINATIONS – May 2023

Sixth Semester

Electrical and Electronics Engineering

U19EE622 – GENERATION OF ELECTRICAL ENERGY

(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is load factor in a power station?	2	K1	CO1
2.	What is diversity factor and plant capacity factor?	2	K1	CO1
3.	How is pumped storage plants different from convention hydroelectric plant?	2	K2	CO2
4.	What do you understand by breeding in a fast breeder reactor?	2	K2	CO2
5.	What is the structural difference between normal diode and solar PV diode?	2	K2	CO3
6.	Whether MPPT of solar PV is performed only during partial shaded conditions? If yes or no give reasons.	2	K2	CO3
7.	Give the expression for available wind power.	2	K1	CO4
8.	Define Airfoil.	2	K1	CO4
9.	What are cogeneration systems? Give an example.	2	K1	CO5
10.	What is the difference between grid-connected and islanded mode?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	A generating station has the following daily load cycle :	13	K3	CO1

Time (Hours)	0—6	6—10	10—12	12—16	16—20	20—24
Load (MW)	40	50	60	50	70	40

Draw the load curve and find

i. maximum demand
ii. units generated per day
iii. average load and
iv. load factor.

(OR)

b) The yearly load duration curve of a power plant is a straight line (fig 1.1). The maximum load is 30MW and the minimum load is 20MW. The capacity of the plant is 35MW.Calculate the plant capacity factor, load factor and utilization factor. 13 K3 CO1

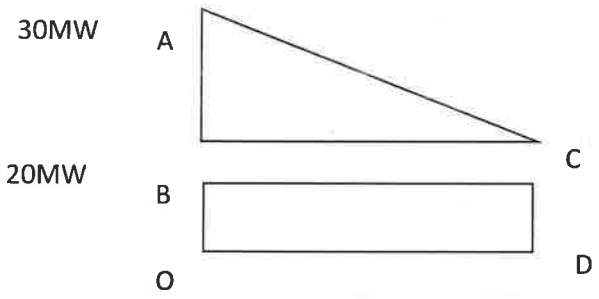

Fig 1.1

12. a) Draw and explain the schematic arrangement of a nuclear power station. 13 K2 CO2

(OR)

b) Draw and explain the schematic arrangement of gas turbine power plant. 13 K2 CO2

13. a) Explain the basic mechanism involved in the energy conversion of solar PV cell and the entities of a solar PV system with a neat block diagram. 13 K3 CO3

(OR)

b) Classify various types of MPPT algorithms. Explain Perturb & Observe and Incremental Conductance algorithm with necessary equations and flow chart. 13 K3 CO3

14.	a)	Explain the basic principle and components of Wind Energy Conversion System (WECS).	13	K2	CO4
		(OR)			
	b)	Explain Betz criterion and the various factors that are to be considered while selecting wind power generation.	13	K2	CO4
15.	a)	Discuss the issues and problems in a parallel-connected cogeneration utility system particularly with respect to the protection and operation of both the systems with relevant sketches.	13	K2	CO5
		(OR)			
	b)	Explain the various modes of operation and control of grid connected micro grid.	13	K2	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	List out the causes of SO2, NOX , CO2 and acid rain pollution caused by the thermal power generation. Also briefly explain the actions through various protocols or amendments taken to circumvent these environmental concerns.	15	K2	CO2
		(OR)			
	b)	Explain the procedures followed to design a solar PV water pumping system that should provide a minimum of 85 liters of water per Watt peak of PV array used per day under average daily solar radiation conditions of 5.5 kWh/sq.m. on a horizontal surface, from a total head of 10 metres (Suction head up to a maximum of 7 metres).	15	K4	CO3

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Question Paper Code: 8004

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – May 2023

Sixth Semester

Electrical and Electronics Engineering

U19EE623 – POWER SYSTEM OPERATION AND CONTROL

(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is Synchronous condenser?	2	K2	CO1
2.	Using a phasor diagram show why shunt capacitors are used for reactive power supply.	2	K2	CO1
3.	Define the incremental fuel or heat rate curve.	2	K1	CO3
4.	What is an incremental fuel cost and what are its units?	2	K2	CO3
5.	Define spinning reverse.	2	K1	CO2
6.	What is unit commitment?	2	K1	CO2
7.	What is the importance of energy control center?	2	K1	CO4
8.	What is EMS System?	2	K1	CO4
9.	Define bad measurements.	2	K1	CO5
10.	What information is obtained with state estimation?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	What is the necessity of reactive power in power system? Compare shunt and series compensation schemes for reactive power compensation. Which scheme is more suitable for voltage control?	13	K2	CO1
		(OR)			
	b)	Using excitation control of synchronous condenser describe the principles of reactive power compensation in transmission system. Also show the effect of excitation on the operation of synchronous condenser.	13	K4	CO1
12.	a)	The fuel cost functions in Rs./hr for three thermal plants are given by $C_1 = 400 + 8.4P_1 + 0.006P_1^2$ $C_2 = 600 + 8.93P_2 + 0.0042P_2^2$ $C_3 = 650 + 6.78P_3 + 0.004P_3^2$	13	K3	CO3

where P_1 , P_2 , and P_3 are in MW. Neglecting line losses and generator limits, determine the optimal scheduling of generation of each loading using the Lambda iterative method for one iteration.

i. $P_D = 550$ MW

ii. $P_D = 820$ MW

(OR)

b) Three power plants of a total capacity of500 MW are scheduled for operation to supply a total system load of 350 MW. Find the optimum load scheduling if the plants have the following incremental cost characteristics and the generator constraints: 13 K3 CO3

$$\frac{dC_1}{dP_{G1}} = 40 + 0.25P_{G1};\ 30 \le P_{G1} \le 150$$

$$\frac{dC_2}{dP_{G2}} = 50 + 0.30P_{G2};\ 40 \le P_{G2} \le 125$$

$$\frac{dC_3}{dP_{G3}} = 20 + 0.20P_{G2};\ 50 \le P_{G2} \le 225$$

13. a) What is the need for unit commitment in power system? How it differs from the economic dispatch? 13 K2 CO2

(OR)

b) Explain the different constraints considered in solving a UC problem. 13 K2 CO2

14. a) What is the importance of Monitoring in energy system? How it is vital for the energy control center operation? 13 K3 CO4

(OR)

b) Describe the operation and functions of SCADA Systems for monitoring and data controls. 13 K3 CO4

15. a) Discuss the need of state estimation. Explain the function of a state estimator. 13 K3 CO5

(OR)

b) Explain the least square estimation process. Explain the applications of state estimation process. 13 K3 CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Why is voltage control required in power systems? Mention the different methods of voltage control employed in power system. Explain one method of voltage control in detail giving a neat connection diagram.	15	K4	CO1
		(OR)			
	b)	Explain economic dispatch of thermal plants co-ordinating the System transmission line losses. Derive relevant equations and state the significance and role of penalty factor.	15	K2	CO2

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Question Paper Code: 5010

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – May 2023

Sixth Semester

Electrical and Electronics Engineering

U19CSOE4 – WEB DESIGNING

(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 – Evaluating
	K2 – Understanding	K4 – Analyzing	K6 – Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Write the major differences between HTML and XHTML.	2	K2	CO1
2.	What are fundamental HTML elements?	2	K1	CO1
3.	Write the style rules in CSS.	2	K2	CO2
4.	How do you write a conditional statement in JavaScript?	2	K3	CO2
5.	How do you create an AJAX request using JavaScript?	2	K3	CO3
6.	Explain the purpose of the ready State property of the XMLHttpRequest object.	2	K2	CO3
7.	Write the difference between INNER JOIN and OUTER JOIN in MySQL.	2	K4	CO4
8.	What is a transaction in MySQL and why is it important?	2	K1 K2	CO4
9.	What is the difference between GET and POST methods in PHP?	2	K1	CO5
10.	What is a PHP function and how do you declare one?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Explain the tag used to add lists and text boxes in HTML.	7	K2	
		ii.	Give the structure of HTTP request and response messages.	6	K1	CO1

(OR)

	b)	Describe the significance of XHTML with the help of a real time application. Write an example.		13	K5	CO1
12.	a)	i.	Explain any eight CSS text properties.	7	K1	CO2
		ii.	Discuss JavaScript Array object in detail.	6	K2	
			(OR)			
	b)	i.	State and explain the types of statements in JavaScript.	6	K2	
		ii.	Explain how functions can be written in JavaScript with an example.	7	K4	CO2
13.	a)	What are the various levels of DOM? Explain each of them in detail.		13	K1	CO3
			(OR)			
	b)	i.	Write the advantages and challenges of using AJAX in web development in detail.	6	K1	CO3
		ii.	What is DHTML, and how does it work with JavaScript?	7	K4	
14.	a)	i.	Explain the features of MySQL database.	6	K1	
		ii.	Explain aggregate functions in MySQL with example.	7	K3	CO4
			(OR)			
	b)	With the help of an example explain each step for accessing the data from a MySQL database table.		13	K3	CO4
15.	a)	Write a program in PHP having a form with firstname, lastname and a submit button. On clicking the button from validation should work (use javascript) and data entry should be saved in database (PHP code needed for insertion). Form should be styled using CSS. (use any mode inline, internal or external)		13	K6	CO5
			(OR)			
	b)	Explain the following with examples:				
		i.	Branching statements in PHP	6.5	K2	CO5
		ii.	Loops in PHP.	6.5	K3	

PART – C

(1 x 15 = 15Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)	Briefly discuss the HTML frame and table tags. Also design a sample web page to include frames and tables.		15	K4	CO1
			(OR)			
	b)	Write SQL Queries for following set of tables: EMPLOYEE (EmpNo, Name, DoB, Address, Gender, Salary, DNumber) DEPARTMENT (DNumber, Dname, ManagerEmpNo, MnagerStartDate). i. Display the Age of 'male' employees. ii. Display all employees in Department named 'Marketing'. iii. Display the name of highest salary paid 'female' employee. iv. Which employee is oldest manger in company? v. Display the name of department of the employee 'SMITH'.		15	K5	CO4

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Question Paper Code: 13006

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – May 2023

Sixth Semester

Electrical and Electronics Engineering

U19CTOE2 – FUNDAMENTALS OF INFORMATION SECURITY

(Regulation 2019)

(Common to Information Technology and Biotechnology)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is masquerading attack?	2	K1	CO1
2.	Alka gives a cheque of Rs.150 to a shopkeeper to buy a book. Later she finds that the cheque was cashed for Rs.1500. Define the type of security attack being applied in this scenario.	2	K3	CO1
3.	What is One-time Pad?	2	K2	CO2
4.	Encrypt "grass is green" in Caesar cipher with key=7.	2	K3	CO2
5.	Name any four types of packets used in PGP and state their purposes.	2	K2	CO3
6.	What are the two modes in which IPSec Operates?	2	K2	CO3
7.	What is the full form of "VIRUS"?	2	K2	CO4
8.	What is a logic bomb?	2	K2	CO4
9.	How can we responsibly and safely store and transmit sensitive information?	2	K3	CO5
10.	What will we do if we are asked to violate a professional duty of cyber security practice in the interests of national security, or some other non-professional ethical interest?	2	K3	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	What are the major security goals of a security system? Explain in brief.	5	K1	CO1
		ii.	Briefly describe four types of attacks threatening integrity of a security system.	8	K5	
			(OR)			
	b)	i.	What is an attack surface?	2	K1	CO1
		ii.	Briefly define and explain the categories of passive and active security attacks.	11		
12.	a)	i.	Distinguish between substitution cipher and transposition cipher.	3	K1	CO2
		ii.	Briefly describe the process of message digest creation in SHA-512.	10	K2	
			(OR)			
	b)	i.	What are the modes of operation for block ciphers? Explain in brief.	4	K2	CO2
		ii.	In which mode block cipher behaves like stream cipher? - Explain briefly.	9	K4	
13.	a)	i.	Explain the four protocols defined by SSL.	4	K2	CO3
		ii.	Briefly explain the format of PGP key ring tables.	9		
			(OR)			
	b)		Explain the various data content types of S/MIME with appropriate diagrams.	13	K3	CO3
14.	a)	i.	What is man-in-the-middle attack?	3	K1	CO4
		ii.	Briefly explain circuit level and packet level firewall and state their advantages and disadvantages.	10	K2	
			(OR)			
	b)	i.	What is a DMZ firewall?	2		
		ii.	Write about the types of analysis adopted by Intrusion Detection and Protection System (IDPS) and the types of IDPS.	11	K1	CO4
15.	a)	i.	Explain in details the pros and cons while developing an information security system.	7	K1	CO5
		ii.	Why ethical issues must be taken into consideration while developing such systems.	6	K2	
			(OR)			
	b)	i.	What are ethical best practices in cyber security?	7	K1	CO5
		ii.	What are cyber security professionals' obligations to the public?	6	K2	

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	Use a brute-force attack to decipher the following message enciphered by Alice using an additive cipher. Assume that Alice always uses a key that is closer to her birthday, which is on the 20th of the month: NCJAEZRCLASJLYODEPRLYZRCLASJLCPEHZDTO PDZQLNZTY.	10	K3	CO2
	ii.	AES provides better security than DES and 3-DES – Justify with proper explanation.	5	K5	CO4
		(OR)			
b)		Explain the vigenere cipher in detail. Encrypt the text "I am Secure" using the key "cipher" using vigenere cipher and obtain the cipher text.	15	K3	CO2

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question paper code: 2002

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – May 2023

Fourth Semester

Electrical and Electronics Engineering

U19MA406 – NUMERICAL METHODS

(Regulation2019)

Time : Three Hours Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is the order of convergence and convergence condition for Newton's method?	2	K1	CO1
2.	Compare Gauss- Jacobi and Gauss- Seidel methods.	2	K2	CO1
3.	Find $\frac{dy}{dx}$ at $x = 1$ from the following data:	2	K1	CO2

x:	1	2	3	4
y:	1	8	27	64

4.	State Lagrange's interpolation formula.	2	K1	CO2
5.	Make use of Trapezoidal rule to find $\int_0^6 f(x)dx$ from the following set of values of x and $f(x)$.	2	K3	CO3

x:	0	1	2	3	4	5	6
f(x):	1.56	3.64	4.62	5.12	7.08	9.22	10.44

6.	What is the order of error in Simpson's formula? When does Simpson's rule give exact result?	2	K1	CO3
7.	Compare Taylor's method and Runge-Kutta method.	2	K2	CO4
8.	What is predictor-corrector method of solving a differential equation?	2	K1	CO4
9.	What is the value of k to solve $u_t = \frac{1}{2}u_{xx}$ by Bender-Schmidt method with $h = 1$ if h and k are increments of x and t respectively?	2	K1	CO5
10.	State the five point formula to solve the Poisson equation $u_{xx}+u_{yy} = 100$.	2	K1	CO5

PART – B

(5 x 16 = 80 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Find the real positive root of $3x - \cos x - 1 = 0$ by Newton's method correct to six decimal places.	8	K1	CO1
		ii.	Solve the following system of equation by Gauss-Seidel method: $6x + 3y + 12z = 35,$ $8x - 3y + 2z = 20,$ $4x + 11y - z = 33$. Correct to three decimal places.	8	K3	CO1
			(OR)			
	b)	i.	Find the dominant eigenvalue and the corresponding eigenvector for the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ by Power method.	8	K1	CO1
		ii.	Make use of Gauss-Jordan method to find the inverse of $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$.	8	K3	CO1
12.	a)	i.	Make use of Lagrange's interpolation formula to find $y(40)$ from the given table below:	8	K3	CO2

x:	30	35	45	55
y:	148	92	68	34

		ii.	Apply Cubic Spline to find $y(1.5)$ and $y'(1)$ for the following data:	8	K3	CO2

x:	1	2	3
y:	-8	-1	18

(OR)

	b)	i.	Make use of Newton's divided difference formula to find $f(9)$ for the below data:	8	K3	CO2

x:	5	7	11	13	17
f(x):	150	392	1452	2366	5202

		ii.	Apply Newton's formula to find $f(7.5)$ for the following data:	8	K3	CO2

x:	1	2	3	4	5	6	7	8
f(x):	1	8	27	64	125	216	343	572

13.	a)	i.	Evaluate $\int_0^5 \frac{dx}{4x+5}$ by using Simpson's $\frac{1}{3}^{rd}$ rule and hence find the value of $log_e 5$ $(n = 10)$.	8	K5	CO3
		ii.	Evaluate $\int_0^1 \int_1^2 \frac{2xy}{(1+x^2)(1+y^2)} dxdy$ by using Trapezoidal rule with $h = k = 0.25$.	8	K5	CO3
			(OR)			

	b)	i.	Evaluate $\int_0^2 \frac{dx}{x^2+4}$ by using Romberg's method.	8	K5	CO3
		ii.	Evaluate $\int_0^1 \int_0^1 \frac{1}{(1+x+y)} dxdy$ by using Simpson's $\frac{1}{3}^{rd}$ rule with $h = k = 0.5$.	8	K5	CO3
14.	a)	i.	Solve $y' = x + y, y(0) =$ `1 by Taylor's series method. Find the values of y at $x = 0.1$.	8	K3	CO4
		ii.	Make use of Milne's method to find $y(4.4)$ given $5xy' + y^2 - 2 = 0, \quad y(4) = 1,$ $y(4.1) = 1.0049, y(4.2) = 1.0097, y(4.3) = 1.0143.$ (OR)	8	K3	CO4
	b)	i.	Solve $y' = \frac{y^2-x^2}{y^2+x^2}$ with $y(0) = 1$ at $x = 0.2$ by Runge-Kutta method of fourth order.	8	K3	CO4
		ii.	Make use of Adam's-Bash forth method to fInd $y(1.4)$ given $y' = x^2(1 + y), y(1) = 1,$ $y(1.1) = 1.233, y(1.2) = 1.548, y(1.3) = 1.979.$	8	K3	CO4
15.	a)	i.	Solve $u_{xx} = 32u_t$, taking $h = 0.25$ for $t > 0$, $0 < x < 1$ and $u(x,0) = 0, u(0,t) = 0, u(1,t) = t.$	8	K3	CO5
		ii.	Solve $y_{tt} = y_{xx}$ up to $t = 0.5$ with a spacing of 0.1 subject to $y(0,t) = 0, y(1,t) = 0, y_t(x,0) = 0$ and $y(x,0) = 10 + x(1-x)$. (OR)	8	K3	CO5
	b)	i.	Solve $u_{xx} + u_{yy} = 0$ over the square mesh of side 4 units, satisfying the following boundary conditions: 1) $u(0,y) = 0, for\ 0 \le y \le 4$ 2) $u(4,y) = 12 + y, for\ 0 \le y \le 4$ 3) $u(x,0) = 3x, for\ 0 \le x \le 4$ 4) $u(x,4) = x^2\ for\ 0 \le x \le 4.$	8	K3	CO5
		ii.	Solve $u_{xx} + u_{yy} = 8x^2y^2$ in the square mesh given $u = 0$ on the four boundaries dividing the square into 16 sub squares of length 1 unit.	8	K3	CO5

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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN

[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]

Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 8005

B.E. / B.Tech DEGREE END-SEMESTER EXAMINATIONS – May 2023

Fourth Semester

Electrical and Electronics Engineering

U19EE410 – LINEAR INTEGRATED CIRCUITS

(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Mention any four characteristics of an ideal operational amplifier.	2	K1	CO1
2.	Define slew rate of an operational amplifier. What is its significance in an op-amp circuits?	2	K2	CO1
3.	You are asked to design an amplifier using OPAMP for a gain with a constraint that the amplifier should have high input impedance. You have two choices i. inverting amplifier and ii. non-inverting amplifier. Which one you will prefer? Why?	2	K3	CO2
4.	Draw the voltage follower circuit using operational amplifier and give its uses.	2	K1	CO2
5.	What do you mean by active peak detector?	2	K2	CO3
6.	Compare Schmitt trigger and comparator.	2	K2	CO3
7.	List four applications of monostable multivibrator using 555 timer.	2	K1	CO4
8.	Distinguish between switching regulator and linear regulator.	2	K2	CO4
9.	Define capture range of a PLL.	2	K1	CO5
10.	What is analog multiplier?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Elaborate any two of the frequency compensation methods of an op-amp circuit with suitable diagram.	13	K1	CO1
		(OR)			
	b)	Draw and explain the internal block diagram of an op-amp and perform the AC analysis of the operational amplifier IC 741.	13	K3	CO1
12.	a)	With a neat circuit diagram explain the working of instrumentation amplifier. Also derive the expressions for the gain of the instrumentation amplifier.	13	K3	CO2
		(OR)			
	b)	With diagram explain the operation of an inverting amplifier in closed loop configuration. Obtain the expression for closed loop gain.	13	K3	CO2
13.	a)	Explain with a neat circuit diagram and waveforms, the working of a positive clipper using an op-amp, which will clip the waveform and $V_{ref} = 2V$.	13	K4	CO3
		(OR)			
	b)	Elaborate how the signal rectification is carried out in the signal processing applications with Half- wave and Full wave circuits. Draw the suitable diagrams.	13	K4	CO3
14.	a)	i. Discuss the operation of successive approximation type ADC with neat diagram.	7	K4	CO4
		ii. Calculate the conversion time of a 10-bit successive approximation converter if its input clock frequency is 5MHz.	6		
		(OR)			
	b)	With neat diagram explain current foldback characteristic and current boosting features of IC 723 general purpose voltage regulator.	13	K2	CO4
15.	a)	With a neat functional diagram, explain the working of IC 555 timer as astable multivibrator and derive an expression for frequency of oscillation.	13	K3	CO5
		(OR)			
	b)	i. Demonstrate the working of Phase Locked Loop(PLL). And explain how PLL can be used as a frequency Synthesizer?	7	K3	CO5
		ii. Calculate the output frequency f_o, lock range Δf_L and capture range Δf_c of a 565 PLL if R_T=10 kΩ and C_T=0.01μF and C=10μF, V_{cc}=± 6V.	6		

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Design a suitable circuit using op-amp to perform the following operations with voltages V_1,V_2 and V_3 i. $V_0 = V_1 + V_2 + V_3$ ii. V_o = avg(V_1, V_2 and V_3) iii. $V_0=V_1-V_2$	15	K6	CO2
		(OR)			
	b)	Design a 555 astable multivibrator to give 2 kHz pulse repetition frequency with 70% duty cycle. Consider Vcc=18V.	15	K6	CO5

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 8009

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – May 2023

Fourth Semester

Electrical and Electronics Engineering

U19EE412 – TRANSMISSION AND DISTRIBUTION OF ELECTRICAL ENERGY

(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define transposition. Identify why are transmission line is transposed.	2	K2	CO1
2.	Describe what happens if the capacitance of a transmission line is very high.	2	K2	CO1
3.	Define transmission efficiency.	2	K2	CO2
4.	Examine the factors which affecting corona.	2	K2	CO2
5.	What is a guard ring or static shielding?	2	K2	CO3
6.	Discuss capacitance grading.	2	K2	CO3
7.	Describe about tower spotting.	2	K2	CO4
8.	What are the types of line supports used in transmission and distribution systems?	2	K2	CO4
9.	Classify distribution system.	2	K2	CO5
10.	Discover two advantages for choosing HVDC over EHV AC for high voltage long distance transmission.	2	K2	CO5

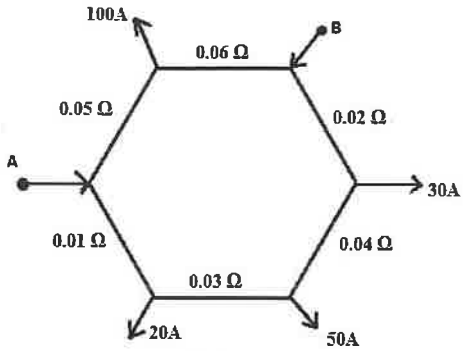
PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)		Derive the expression for calculation the internal and external flux linkages for a conductor carrying current. Use these expressions to derive the equation for the inductance of a single-phase transmission line.	13	K2	CO1
			(OR)			
	b)	i.	Derive the expression for capacitance of a single-phase overhead line.	6	K3	CO1
		ii.	Find out the capacitance of single-phase line of 30km long consisting of two parallel wires each 15mm diameter and 1.5m apart.	7	K3	
12.	a)		Derive the expression power flow through transmission line and explain various steps involved in sending end power circle diagram with neat sketch.	13	K3	CO2
			(OR)			
	b)		A 3 phase 100km line has the following constants. Resistance/phase/km = 0.153ohm, inductance/phase/km = 1.21mH, Capacitance/phase/km = 0.00958μF. If the line supplies a load of 20MW at 0.9 pf lagging at 110kV at the receiving end calculate sending end current, sending end power factor, regulation and transmission efficiency using nominal T method.	13	K3	CO2
13.	a)	i.	Derive the expression for voltage distribution in insulator string and string efficiency.	8	K3	CO3
		ii.	Derive the methods of improving string efficiency.	5	K2	
			(OR)			
	b)	i.	Derive an expression for the capacitance of a single core cable.	6	K3	CO3
		ii.	Find most economical diameter of a single-core cable to be used on a 132kV, 3-phase system. Find also the overall diameter of the insulation if the peak permissible stress is not to exceed 60kV/cm. Derive the formula used.	7	K3	
14.	a)		An overhead line at a river crossing is supported from two towers of heights 30 meters and 90 meters above water level with a span of 300 meters. The weight of the conductor is 1 kg/meter and the working tension is 2000 kg. Determine the clearance between the conductor and the water level mid-way between the towers.	13	K4	CO4
			(OR)			
	b)		Derive an expression for sag of a line supported between two supports of the same height. Also Explain the effect of ice and wind loading.	13	K3	CO4

15. a) i. Draw and explain a ring main distributor scheme. 6 K2 CO5

ii. Find the current supplied at points A and B of the ring main distributor shown in fig, the loads are at unity power factor. 7 K3



(OR)

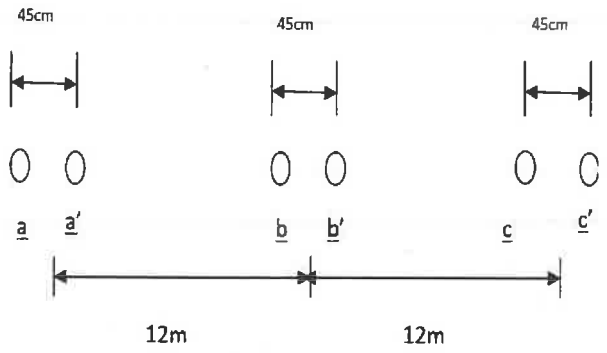
b) i. Explain the applications of HVDC transmission systems. 6 K2 CO5

ii. Discuss the advantages of HVDC transmission over HVAC transmission in detail. 7 K2

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	Show that the inductance per unit length of an overhead line due to internal flux linkage is constant and independent of size of conductors.	5	K3	CO1
	ii.	A 400kV 3 phase bundled conductor line with sub-conductor per phase a horizontal configuration as shown in figure. The radius of each of sub-conductor is 1.6cm	10	K3	



(OR)

b) A 2km long 3core, 3 phase cable has capacitance 0.5μF/km between two conductors bunched with sheath and the third conductor. The capacitance between the conductors is also measured when bunched together and the sheath and found to be 0.75μF/km. Determine 15 K3 CO3

i. Capacitance between phases
ii. Capacitance between the conductor and the sheath
iii. Effective per phase capacitance
iv. Capacitance between two conductors connecting third conductor to the sheath
v. Charging current if the supply voltage is 11kV,50Hz.

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Question Paper Code: 5016

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – May 2023

Fourth Semester

Electrical and Electronics Engineering

U19CS417 – DATA STRUCTURES

(Regulation 2019)

(Common to Biomedical Engineering)

Time : Three Hours | Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define Abstract Data Type(ADT).	2	K1	CO1
2.	Compare file structure and storage structure.	2	K2	CO1
3.	Find the equivalent postfix expression for (A+B)/(D*E-F)	2	K1	CO1
4.	What is dequeue?	2	K1	CO2
5.	List the applications of the binary trees.	2	K1	CO3
6.	What is a heap data structure?	2	K1	CO3
7.	Identify the various types of graphs.	2	K2	CO4
8.	Summarize the applications of directed graphs.	2	K2	CO4
9.	Tell the worst case and best case time complexity of selection sort.	2	K1	CO5
10.	What are the limitations of hashing techniques?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q. No.		Questions	Marks	KL	CO
11.	a)	Develop a function to add two polynomials (of two variables) using linked lists.	13	K6	CO1
		(OR)			
	b)	Write an algorithm for deletion of an element from a priority queue.	13	K3	CO1
12.	a)	Explain the infix to postfix conversion process using stack data structure with the help of a suitable example.	13	K2	CO2
		(OR)			
	b)	Write an algorithm for insertion and deletion of an element in a queue. Illustrate with an example.	13	K3	CO2
13.	a)	Write recursive algorithms for the binary tree traversal of a binary tree. Explain the methods with the help of examples.	13	K3	CO3
		(OR)			
	b)	Outline the operations of heap with an example.	13	K3	CO3
14.	a)	Differentiate between the working of Prim's algorithm and Kruskal's algorithm.	13	K2	CO4
		(OR)			
	b)	Write recursive algorithm for Breadth-First Traversal of a graph assuming that adjacency matrix representation of the graph is given as input.	13	K5	CO4
15.	a)	Illustrate the best case, average case, and worst case time complexities of the Insertion Sort algorithm.	13	K2	CO5
		(OR)			
	b)	Discuss the concepts of extendible hashing and rehashing.	13	K6	CO5

PART – C

(1 x 15 = 15Marks)

Q. No.		Questions	Marks	KL	CO
16.	a)	Analyze how to perform the basic operation of AVL tree	15	K4	CO3
		(OR)			
	b)	Develop an algorithm for quick sort.Sort the following numbers using quick sort: 77,44,22,33,88,99,66,11,44	15	K6	CO5

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Question Paper Code: 8012

B.E. / B.Tech DEGREE END-SEMESTER EXAMINATIONS – May 2023

Fourth Semester

Electrical and Electronics Engineering

U19EE413 – CONTROL SYSTEMS

(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

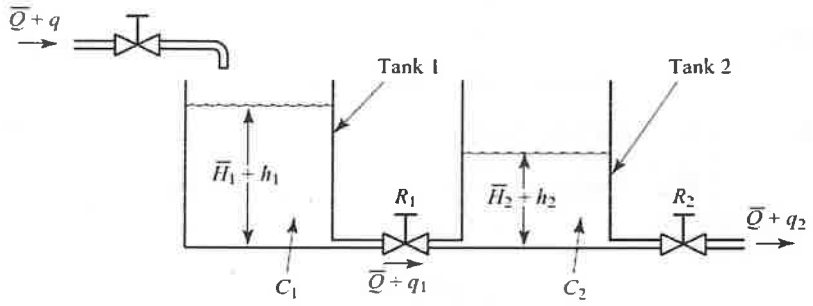
Q.No.	Questions	Marks	KL	CO
1.	Distinguish between dynamic variables and parameters in a system model. Illustrate with an example.	2	K2	CO1
2.	How will you model a "Time delay" in process actuators. How this affects the closed loop behavior of a system?	2	K4	CO1
3.	The control system performance analysis usually done on the pair of the "Dominant Poles". Why is this so? Where are these poles typically located in the s plane?	2	K2	CO2
4.	What do understand by 'Type and Order' of a system? Illustrate with examples.	2	K1	CO2
5.	When a sinusoidal excitation is applied to a system with excitation frequency matching the natural frequency of the system, what is the outcome?	2	K4	CO3
6.	What do understand by Gain and phase shift in a frequency response? How are they related to time domain behavior?	2	K3	CO3
7.	If a system has a pair of poles on the imaginary axis, how it shows up in the Routh Hurwitz table? How will you complete the RH test in this case?	2	K2	CO2
8.	For what corrections/improvements on the time domain response of a system, the lag and lead compensators are deployed?	2	K2	CO2
9.	From the solution of a state equation of a LTIV system, identify the 'Zero input response' and 'Zero state response' of the system	2	K2	CO5

10.	What is the 'Control law' in pole placement design? What condition, the state model should satisfy for an arbitrary pole placement.	2	K2	CO5

PART – B

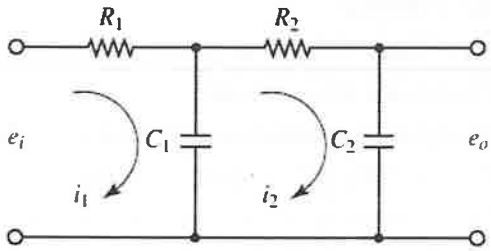
(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	For the Liquid level systems shown in fig. write the system equations, assuming a linear behavior around the quiescent operating point. Convert them to 's' domain and represent this set of equations through a block diagram.	13	K3	CO1

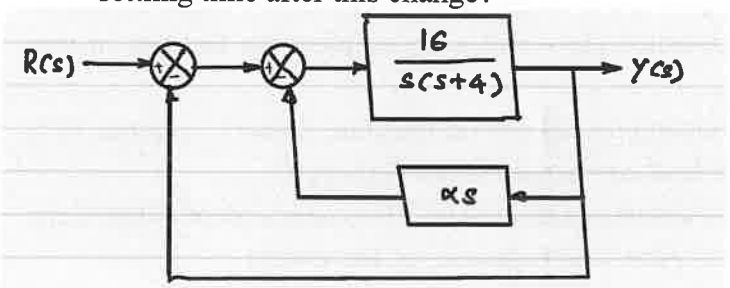


(OR)

b)	Represent the electrical circuit shown in fig by a signal flow graph. By using the Mason's Gain formula obtain the transfer function $E_o(s)/E_i(s)$.	13	K3	CO1



12. a)	The System shown in fig is a unity feedback control system with a inner rate feedback loop.			
	i. In the absense of a innerfeedback loop ($\alpha = 0$), determine the peak overshoot of the system to a unit step input. What is the settling time.	5	K2	CO2
	ii. Determine the rate feedback constant α which will decease the peak overshoot to a unit step to 1.5% . What is the effect of settling time after this change?	8		



(OR)

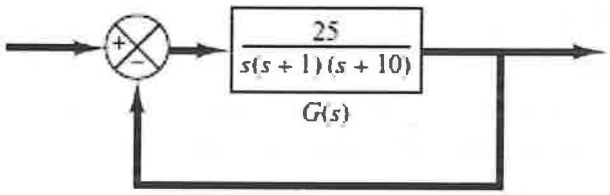
b) The open loop transfer function of the control system is given by $G(s)H(s) = \frac{K(s+1)^2}{(s+2)^2}$ Sketch the Root locus. Show that the RL is a circle with radius 0.5 with center at (-1.5 , 0) — 13 — K3 — CO2

13. a) The open loop transfer function of a unity feedback control system is given by $G(s) = \frac{K}{s(sT_1+1)(sT_2+1)}$. Derive an expression for gain K in terms of T_1 and T_2 and the specified gain margin G_m — 13

Derive an expression for gain K in terms of T1 and T2 and the specified gain margin Gm

(OR)

b) Consider the system shown in Figure. Draw a Bode diagram of the open-loop transfer function G(s). Determine the Phase and gain Margin — 13 — K3 — CO3



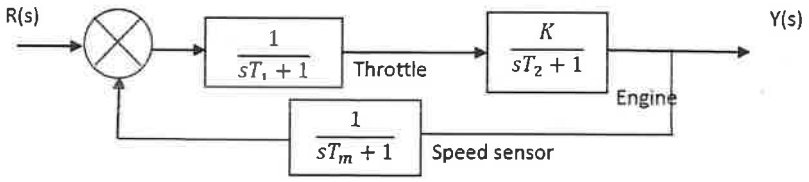
14. a) The open loop T.F of a unity feedback control system is given by $G(s) = \frac{K}{(s+2)(s+4)(s^2+6s+25)}$

i. Using RH criteria find the range of K for which the closed loop system is stable — 7 — K3 — CO4

ii. What is the value of K which causes sustained oscillations? , and find the oscillation frequencies. — 6

(OR)

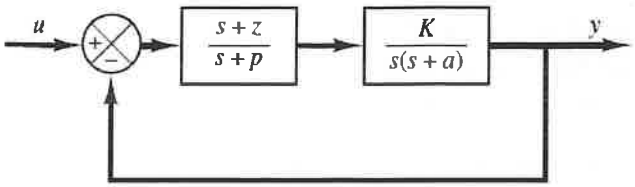
b) A speed control scheme for a gasoline engine is shown in fig. The Throttle time constant T_1 is 1 sec. The engine time constant is 3 sec. The time constant of the speed measuring device is 0.4 sec a) Determine the necessary gain if the steady state error is required to be less than 10% of the speed reference setting. (b) With the gain determined in part (a) apply Nyquist criterion to investigate the stability of the system. — 3+10 — K3 — CO4



15. a) For the state equation $\dot{X}(t) = \begin{bmatrix} 0 & 1 \\ -8 & -6 \end{bmatrix} X(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ and the initial conditions are given by $X(0) = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ Find the state Transition matrix and solve for Zero input response of X(t) — 13 — K3 — CO5

(OR)

b) Obtain a state-space representation of the system shown in Figure. 13 K3 CO5



PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	The Impulse Response of a LTIV system with zero initial conditions is equal to h(t). When an arbitrary input r(t) is applied to the system, what will be the output response? Derive this expression from the first principles, using the linearity and time-invariance properties of the system.	10	K4	CO2
	ii.	Derive the equivalent 's' domain representation of the system model using the Laplace transform methods.	5		

(OR)

b)		Nyquist Stability Criterion is an application of Cauchy's residue theorem from complex variables theory. State the theorem and the properties of conformal mapping. How this theorem and the mapping properties are used to derive the Nyquist stability criterion by mapping a select 's' plane contour to GH plane.	15	K4	CO3

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Question Paper Code: 8011

B.E./ B.Tech. DEGREE END-SEMESTER EXAMINATIONS – May 2023
Fourth Semester
Electrical and Electronics Engineering
U19EE411 – AC MACHINES
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is meant by "full pitch" and "fractional pitch"?	2	K1	CO1
2.	What do you understand by infinite bus bar?	2	K1	CO1
3.	What is synchronous condenser? Mention its application.	2	K1	CO2
4.	What is the effect of speed of a synchronous motor if load on it is increased?	2	K2	CO2
5.	Why the rotor of an induction motor is skewed?	2	K3	CO3
6.	Can 3-phase induction motor run at synchronous speed? If not, give the reason.	2	K3	CO3
7.	What is need of a starter, to start a 10 HP induction motor?	2	K2	CO4
8.	Explain briefly working of star-delta starter?	2	K1	CO4
9.	What are the applications of a stepper motor?	2	K1	CO5
10.	What is the principle of linear induction motor? Write its applications	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	A 3-phase star connected 1200 kVA, 3.3 kV; 50 Hz alternator has armature resistance of 0.25 ohms per phase. A filed current of 40 A produces a short-circuit current of 200 A and an open circuit emf of 1100 V between lines. Calculate voltage regulation on full load 0.8 power factor (lagging).	13	K3	CO1

		(OR)			
	b)	Two alternators are operating in parallel, explain the change in excitation of one of the alternator and draw the phasor diagram.	13	K2	CO1
12.	a)	Draw and explain V and inverted V curves of a Synchronous motor? Discuss its importance	13	K2	CO2
		(OR)			
	b)	A 6.6 kV, 3-phase star connected synchronous motor draws a full load current of 80 A at 0.8 pf leading. The armature resistance is 2.2 ohms and synchronous reactance is 22 ohms per phase. If the stray losses of the machine are 3200 W, determine a) the emf induced b) the output power and c) the efficiency.	13	K3	CO2
13.	a)	Develop the equivalent circuit of a 3-phase induction motor. Explain how the mechanical power developed in the motor is taken care in this circuit.	13	K4	CO3
		(OR)			
	b)	A 440 V, 50 Hz, 6 pole, 3-phase induction motor draws an input power of 81 kW from the mains. The rotor emf makes 120 complete cycles per minute. Its starter losses are 1 kW and rotor current per phase is 65 Amps. Calculate i. Rotor Copper losses per phase ii. Rotor resistance per phase and iii. Torque developed	13	K2	CO3
14.	a)	Explain the method of speed control of a 3-phase slip-ring induction motor by changing the rotor circuit resistance. What are the advantages and limitations of this method?	13	K2	CO4
		(OR)			
	b)	What are the various methods of speed control of 3-phase Induction Motors? Explain the working of direct-on-line starter with a neat sketch.	13	K1	CO4
15.	a)	With a neat diagram explain operation of Switched Reluctance Motor? Write its applications?	13	K2	CO5
		(OR)			
	b)	i. Why single phase induction motors are not self-starting? What are the methods to make them self starting?	6	K3	CO5
		ii. Explain with a neat sketch principle of operation of any one of the single –phase induction motor?	7	K1	

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Determine the voltage regulation by zero power factor method of a 500 kVA, 6600 V, three-phase. Star connected alternator having a resistance of 0.075 ohms per phase, when delivering a current of 500 A at power factor i. 0.8 lagging ii. 0.707 leading and iii. unity. The alternator has the following open circuit and full-load zero power factor curves:	15	K4	CO1

Field current(Amps):	24	32	50	75	100	125	150
Open Circuit terminal voltage (kV))	1.4	–	4.5	6.4	7.5	8.1	8.4
Saturated curve, zero pf(kV)	0	0	1.9	4.2	5.7	6.75	7.1

(OR)

b)	Two squirrel cage induction motors A and C are identical in all respects except that the rotor of A is made of aluminium having a resistivity of 3×10^{-8} ohm –m and that of motor C is made of copper having a resistivity of 2×10^{-8} 0hm – m. The starting torque of motor A is 120 Nm. Compute the staring torque of motor C.	15	K6	CO3