CODE: 16CE4025 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B. Tech I Semester Supplementary Examinations, January-2020

REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Outline EMR and indicate UV, Visible and IR portion.	7M
	b)	Draw the various spectral signatures of the Earth's surface materials and explain how the EMR is interacting with water?	7M
		(OR)	
2.	a)	What is meant by atmospheric windows and explain it with a neat sketch?	7M
	b)	Briefly List out IRS Satellites.	7M

UNIT-II

3.	a)	Differentiate between Active Remote sensing and Passive Remote sensing.	7M
	b)	Illustrate the types of orbits with neat diagrams?	7M
		(OR)	
4.	a)	Explain the various data products of Indian remote sensing.	7M
	b)	Write the resolutions of a sensor.	7M

UNIT-III

5.		Review in detail about the various elements of image interpretation in remote sensing.	14M
		(OR)	
6.		Show the flow chart of image classification? Explain the supervised classification?	14M

UNIT-IV

7.	a)	Explain Azimuthal projection and its significance.	7M
	b)	Describe the parameters of projection.	7M
		(OR)	
8.	a)	Describe about GIS data file management.	7M
	b)	Classify data in GIS context and explain spatial data editing.	7M

UNIT-V

9.	a)	Evaluate on sustainable urban planning with respect to RS.	7M
	b)	Explain the applications of RS in civil engineering.	7M
		(OR)	
10.	a)	Explain Applications of GIS in various fields.	7M
	b)	Analyze the study of landslides with the help of GIS.	7M

AR16

CODE: 16EE4023 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B. Tech I Semester Supplementary Examinations, January-2020

POWER SEMICONDUCTOR DRIVES

(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	State what is regenerative braking and explain regenerative braking in separately exited motor.	7M
	b)	State what is dynamic braking and explain dynamic braking in series motor.	7M
		(OR)	
2.	a)	Describe the operation of a dc drive in all four quadrants when fed by a single –phase dual converter, with necessary waveforms and characteristics?	7M
	b)	A 400V, 25h.p.(18.65KW), 450 r.p.m DC shunt motor is braked by plugging when running on full load. Determine resistance necessary if the maximum braking current is not to exceed twice the full load current. Also determine the maximum braking Torque and the braking torque when the motor just reaches zero speed. The efficiency of the motor is 74.6% and the armature resistance is 0.2Ω.	7M

UNIT-II

3.		Describe the operation of single phase fully controlled rectifier fed to a DC series motor and obtain the expression for motor speed for continuous mode of operation.	14M
		(OR)	
4.	a)	Describe the operation of single phase Semi Controlled Converter connected to dc Series Motor.	7M
	b)	A 220V, 20A, 1500 rpm. DC separately excited motor with Armature Resistance of 0.2Ω is fed from a Three phase full converter. Available AC source has line voltage of 400V, 50Hz. A star- star connected Transformer is used to feed the Armature. Find the Firing angle of the converter when the motor is running at rated speed and supplying Rated Torque. (Assume continuous conduction mode)	7M

UNIT-III

5.	a)	Describe the Operation of type B or step up Chopper fed to separately excited DC motor. Draw Voltage and Current waveforms. Obtain speed torque equation and draw speed-Torque characteristics	10M
	b)	A 210V, 25A, 1500rpm dc motor has an armature resistance of 3Ω is controlled by chopper. The chopping frequency is 500Hz and input voltage is 230V. Calculate the duty ratio for a torque of 1.5 times the rated torque at 800rpm?	4M
		(OR)	

6. a) A 230V separately excited DC motor takes a 50A at speed of 800 r.p.m. It has armature resistance of 0.4Ω. This motor is controlled by a chopper with an input voltage of 230V and frequency of 500Hz. Assuming continuous conduction throughout .Find the Speed and Torque for motoring operation at duty ratios of 0.3. Find the Speed and Torque for Regenerative braking operation at duty ratio of 0.7. 7M

b) Draw the circuit diagram and explain the operation of closed-loop speed control with inner-current loop and field weakening? 7M

UNIT-IV

7. a) Using a diagram and torque speed curve, explain the stator voltage control scheme for the speed control of a three phase induction motor? 7M

b) A three phase ,star-connected,30hp,480V,sixpole,60HZ,slip ring induction motor has a stator resistanceR1=0.5Ω and a rotor resistance referred to stator R^1_2 =0.5Ω. The motor runs at a speed of 1200rpm.Assume that the load torque is constant and equal to 120Nm.Ignore the rotational losses and calculate the motor speed at full voltage. Repeat the computation if the voltage is reduced by 20%. 7M

(OR)

8. a) Describe the method of speed control of an induction motor by V/F control and draw the speed torque characteristics? 7M

b) A 440 V,50 Hz ,6 pole ,Y-connected squirrel cage induction motor has the following parameters :R=0.6Ω, R =0.3Ω, X=1Ω, X =1Ω and motor full load slip is 0.05. The motor is controlled by a voltage source inverter at constant V/f ratio. For an operating frequency of 10 Hz calculate the breakdown torque and speed at which it occurs. 7M

UNIT-V

9 Explain the difference between Rotor Resistance control methods and slip power recovery schemes? 14M

(OR)

10. a) Describe the operation of Static scherbuis Drive with relevant circuit diagram? 7M

b) A 3-phase, 4-pole, 50Hz induction motor has a chopper controlled resistance in the rotor circuit for speed control. Load torque is ω^2. When the thyristor is ON, the torque is 40 N-m at an average slip of 0.04. If T_{ON}/ T_{OFF} = 1, compute the average torque and speed. The motor develops a torque of 75% when the thyristor is off. If the speed variation range is down to 1250rpm from synchronous speed. Determine the ratio T_{ON}/ T_{OFF} require to obtain the average torque of 35N-m 7M

AR16

CODE: 16IME4026 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B. Tech I Semester Supplementary Examinations, January-2020

INDUSTRIAL HYDRAULICS AND PNEUMATICS

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Why are hydraulic systems preferred for heavy work than the pneumatic systems?	4M
	b)	Sketch and explain external gear pump.	10M

(OR)

2.	a)	List out the five fields of applications of fluid power?	5M
	b)	Define vane pump? How vane pumps are classified?	9M

UNIT-II

3.	a)	What are the accessories used along with an accumulator and what are their specific functions?	5M
	b)	Draw symbolic representations of (i) Two-position, four-way valve; (ii) Two-position, four-way, solenoid-operated, spring return; and (iii) Two-position, four-way, manual spring return	9M

(OR)

4.	a)	Classify hydraulic control valves and explain the working of a check valve with a neat sketch and give its graphical representation	7M
	b)	With the help of neat sketch explain how pilot operated check valve differ from a simple check valve	7M

UNIT-III

5.	a)	Sketch and explain the meter-in circuits	7M
	b)	Sketch and explain the hydraulic press circuit.	7M

(OR)

6.	a)	What is hydraulic clamping and what components are used for this operation? Make a sketch of the circuit for hydraulic clamping.	8M
	b)	Evaluate the pump capacity required in case of drilling for the hydraulic power unit having 6.3cm drilling cylinder bore diameter and 0.2m/min drilling speed. Estimate the working pressure for the 500kg load of the drilling cylinder.	6M

UNIT-IV

7.	a)	Compare the difference between pneumatic, hydraulic and electrical systems with respect to medium, storage, transmission and sensitivity to environments.	8M
	b)	Present the graphic symbols (i) Push button-operated; (ii) Pilot air- operated; and (iii) Single-solenoid operated, for 3/2 direction control valve	6M

(OR)

8.	a)	Write the principles of an air-compression system focusing on control of pneumatics with neat sketch.	8M
	b)	Mention the ways to activate a 5/2 pneumatic direction control valve	6M

UNIT-V

9.	a)	Differentiate a time delay valve and a pressure sequence valve in their applications. Draw the symbols and explain briefly.	8M
	b)	In an OR gate, in case, two input signals are given, will there be an output signal? Mention an application when an OR gate is needed in a pneumatic circuit. How many input and output signal connections are available in AND gate and OR gate valves?	6M

(OR)

10.	a)	Brief on the working of pressure sequence valve with neat sketch.	7M
	b)	State the functions of the essential elements in a pneumatic circuit with a neat sketch.	7M

AR16

CODE: 16EC4027 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B. Tech I Semester Supplementary Examinations, January-2020

MICROWAVE ENGINEERING

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Define and explain i) Cut-off frequency ii) Cut-off wavelength iii) Wave impedance	8 M
	b)	An air filled rectangular wave guide operated in TE_{10} mode has dimensions of a= 6 cm and b = 4 cm. The signal frequency is 3 GHz. Find: (i) Cut-off wavelength (ii) Phase constant.	6 M

(OR)

2.	a)	Derive the TE mode expressions for rectangular wave guide.	8 M
	b)	Explain why TEM mode is not possible in hollow waveguides.	6 M

UNIT-II

3.	a)	Derive the s-matrix for 3-port circulator.	7 M
	b)	Explain the construction of a Directional coupler.	7 M

(OR)

4.	a)	With neat sketches, Explain the working of Gyrator.	7 M
	b)	Find the S- Matrix for a matched isolator having an insertion loss of 0.5 dB and isolation of 25 dB.	7 M

UNIT-III

5.	a)	Draw the Applegate diagram of two cavity klystron and explain all the components involved.	8 M
	b)	What are the limitations of conventional vacuum tubes at microwave frequencies?	6M

(OR)

6.	a)	A two cavity klystron amplifier has the following parameters: V_0=600 V, R_0= 30 KΩ, I_0 = 20mA, gap spacing d=1 mm, cavity spacing L = 4cm. Find (i) The gap transit angle, (ii) DC transit angle	6 M
	b)	A reflex klystron has the following parameters: V_0=600 V, I_0 = 11.45 mA, the tube is oscillating at f_r at the peak of the n = 2 mode. Assume that X^1 = 1.841 and $J_1(X^1)$ = 0.582. Find (i) AC output power, (ii) Efficiency of the tube	8 M

UNIT-IV

7.	a)	Explain the construction of 8 cavity cylindrical magnetron with a neat sketch.	7 M
	b)	Explain the pi mode of operation of magnetron.	7 M

(OR)

8.	a)	What are the advantages of magnetron over other microwave sources? Mention few applications of magnetron.	7 M
	b)	Write a brief notes about suppression of oscillations in Travelling Wave Tube Amplifier.	7 M

UNIT-V

9.	a)	Distinguish between Transferred Electron Devices (TEDs) and Avalanche Transit Time Devices (ATDs).	5 M
	b)	Give brief note about GUNN oscillation modes	9 M

(OR)

10.	a)	Draw a microwave bench setup to measure the frequency and explain measurement procedure.	6 M
	b)	Draw a microwave bench setup to measure the VSWR of a given component and explain the procedure.	8 M

AR16

CODE: 16CS4024 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B. Tech I Semester Supplementary Examinations, January-2020

UML & DESIGN PATTERNS

(Common to CSE and IT)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.		Explain in detail about conceptual model of UML	14M
		(OR)	
2.	(a)	Explain the UML's Structural Diagrams Briefly?	7M
	(b)	Describe forward engineering and reverse engineering?	7M

UNIT-II

3.	(a)	Explain the steps to model flows of control by organization?	7M
	(b)	Draw a collaboration diagram that specifies the flow of control involved in registering a student to course?	7M
		(OR)	
4.	(a)	Explain about various relationships possible among use cases?	7M
	(b)	What are swim lanes? Explain with a Activity Diagram?	7M

UNIT-III

5.	(a)	Briefly Explain the four kinds of events modelled by UML?	7M
	(b)	Draw a state chart diagram for library management system?	7M
		(OR)	
6.	(a)	Distinguish between nodes and components?	7M
	(b)	Draw and explain a deployment diagram for student management system?	7M

UNIT-IV

7.	(a)	Define design Pattern? Explain about design patterns in small talk MVC?	7M
	(b)	Explain briefly the catalogue of design patterns?	7M
		(OR)	
8.		Explain how design patterns solve design problems? Write the uses of design patterns.	14M

UNIT-V

9.	(a)	Explain briefly about Adapter pattern?	7M
	(b)	Explain the implementation issues considered when applying bridge pattern?	7M
		(OR)	
10.	(a)	List and explain the benefits and liabilities of chain of responsibility?	7M
	(b)	Explain briefly about command pattern?	7M

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AR13

CODE: 13EE4022 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B. Tech I Semester Supplementary Examinations, January-2020

POWER SEMI CONDUCTOR DRIVES

(Electrical & Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) What are the three intervals present in discontinuous conduction mode of single phase half controlled rectifier?
   b) What are the functions performed by electric drives?
   c) What is meant by regenerative braking?
   d) What are the methods of operation of electric drives?
   e) State the advantages of dc chopper drives?
   f) What are the types of control strategies in dc chopper?
   g) What are the 3 modes of region in the adjustable-freq IM drives characteristics?
   h) Where is the V/f control used?
   i) Why the static scherbius drive has a poor power factor?
   j) How is super synchronous speed achieved?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. Explain the operation of single phase full controlled rectifier control of dc separately excited motor for continuous and discontinuous modes of operations with aid of diagrams and waveforms. Also obtain the expression for motor terminal voltage and speed. 12M

(OR)

3. Explain the operation of Three phase half controlled rectifier control of dc series motor for continuous and discontinuous modes of operations with aid of diagrams and waveforms. Also obtain the expression for motor terminal voltage and speed. 12M

UNIT-II

4. a) Describe the single phase four quadrant operation of separately excited dc motor using dual converters. 6M
   b) A200V, 1000A DC series motor runs at 1000rpm is operated under dynamic breaking at twice the rated torque and 800 rpm. The resistance of armature and field winding is 0.1 ohm. Calculate value of breaking current and resistance. 6M

(OR)

5. a) What are the advantages electrical braking over the mechanical braking? 5M
   b) A220V dc series motor runs at 1200 rpm and takes an armature current of 100A. When driving a load with a constant torque. Resistance of armature and field windings are 0.05 ohm each. Dc series motor is operated under dynamic breaking at twice the rated torque and 1000rpm. Calculate the value of braking current and resistance. Assume linear magnetic circuit. 7M

UNIT-III

6. a) Explain what the applications of chopper fed dc drives ? 4M

b) A DC chopper is used for regenerative braking of a separately excited DC motor. The supply input voltage is 400 V, Ra = 0.2 Ω, Km = 1.2 V-sec/rad. The average armature current during regenerative braking is kept constant at 300 A. For a duty cycle of 60% of chopper, determine the following: (i) Power returned to supply. (ii) Minimum and maximum braking speeds. 8M

(OR)

7. Explain the four quadrant operation of chopper fed dc series motor with aid of diagrams and waveforms and speed torque expressions. 12M

UNIT-IV

8. a) Explain and compare the operation of VSI and CSI fed induction drives? 6M

b) A three-phase, 440 V, 1000 rpm slip ring induction motor is operating with 4 % slip. Stator current is 30 A. Determine the stator current if the speed of the motor is reduced to 500 rpm using stator voltage control method. 6M

(OR)

9. Explain the stator voltage control schemes of induction motor, also draw and explain the speed torque curves. 12M

UNIT-V

10. Explain how the slip will recover by Static Scherbius with various Modes of Operation?

(OR)

11. a) Draw the circuit diagram and explain the operation of Self Controlled Synchronous motor drive employing load commutated inverter. 6M

b) A three phase, 4-pole, 50 Hz, star connected synchronous motor has X_S = 6 Ω, Ra = 0, Ea = 6000 V, E_f = 5000V all per phase values. What is the value of pull out torque? 6M

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AR13

CODE: 13EC4029 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

IV B. Tech I Semester Supplementary Examinations, January-2020

MICROWAVE ENGINEERING

(Electronics & Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Give the dominant mode for TE and TM waves in a rectangular waveguide.
   b) Mention the characteristics of TEM waves.
   c) What are the properties of scattering matrices?
   d) List two microwave devices using faraday rotation principle.
   e) What is the effect of transit time?
   f) Give the drawbacks of klystron amplifiers.
   g) What is meant by strapping?
   h) List the advantages of TWT
   i) What is the key phenomenon taking place in TRAPATT diode?
   j) Define Bolometer.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2.	a)	Derive the wave equations for TM wave and obtain all field components in a rectangular waveguide.	8M
	b)	Calculate the lowest resonant frequency of a rectangular cavity resonator of dimensions a=2cms, b=1cm, and d=3cms.	4M
		(OR)	
3.	a)	Distinguish between TE and TM modes of propagation in a rectangular waveguide	6M
	b)	When the dominant mode is propagated in an air filled rectangular waveguide, the guide wavelength for a frequency of 9000MHz is 4cm. calculate breadth of the guide?	6M

UNIT-II

4.	a)	Explain the functioning of flap attenuator and vane attenuators.	6M
	b)	A 4 port 10dB Directional coupler having 40dB directivity has a transmission loss of 1dB. For an input power of 10mW at port 1 of main arm, determine the power at other ports	6M
		(OR)	
5.	a)	State the properties of Scattering parameters. Derive the S-matrix of a Magic tee	6M
	b)	What are applications of magic Tee? Explain.	6M

UNIT-III

6	a)	Explain the construction and operation of four-cavity klystron amplifier	6M
	b)	What are the limitations of conventional vacuum tubes at microwave frequencies?	6M
		(OR)	
7.	a)	Derive an expression for the efficiency of a two-cavity klystron amplifier, starting from basic principles.	6M
	b)	Draw the output power characteristics of Reflex Klystron and explain how oscillating modes are formed.	6M

UNIT-IV

8.	a)	What are slow wave structures? Explain how a helical TWT achieves amplification	6M
	b)	Describe the working principle of a cylindrical magnetron and derive the hull cut-off voltage equation.	6M
		(OR)	
9.	a)	Explain the terms frequency pulling and frequency pushing with reference to a magnetron.	6M
	b)	A normal circular magnetron has the following parameters Inner radius R_a = 0.15m, Outer radius R_o = 0.45m, Magnetic flux density β_o =1.2 mWb/m^2. Determine (i) Hull cut-off voltage (ii) cyclotron frequency in GHz.	6M

UNIT-V

10.	a)	Explain Gunn effect using the two valley theory and What are the applications of gunn diode.	7M
	b)	Compare IMPATT diode and TRAPATT diode	5M
		(OR)	
11.	a)	Describe how can the power of a microwave generator be measured using (i) Bolometer (ii) calorimeter techniques.	8M
	b)	Explain the double minimum method of measuring VSWR.	4M

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