# AR16

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**
**(AUTONOMOUS)**
**IV B.Tech I Semester Regular Examinations, November-2019**

**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) | Explain different components of remote sensing with neat sketch | 7M |
| | b) | Explain the importance of visual spectrum band, near infrared (NIR) and thermal infra band in remote sensing. | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 2. | a) | Explain Mie and Rayleigh scattering with example and neat sketch. | 7M |
| | b) | Explain spectral signature and spectral reflectance curve of vegetation with neat sketch | 7M |

### UNIT-II

| | | | |
|---|---|---|---|
| 3. | a) | Explain different types of platform available for remote sensor with example. | 7M |
| | b) | Explain active and passive remote sensor with neat sketch. | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 4. | a) | Explain radiometric resolution of a sensor. Compute range of DN values for 10 bit sensor. | 7M |
| | b) | Define digital image. Explain standard, geocoded and precision digital data product. | 7M |

### UNIT-III

| | | | |
|---|---|---|---|
| 5. | a) | Explain the difference between tone, rough texture and smooth texture with example | 7M |
| | b) | Explain digital image, gray scale, color image and histogram of an image. | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 6. | a) | Explain Selective key and Elimination key applied in image processing | 7M |
| | b) | Explain the difference between a supervised and unsupervised image classification? | 7M |

### UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | What do you mean by human ware? Explain hardware components of GIS | 7M |
| | b) | Explain spaghetti vector data model and mention advantages of vector data model. | 7M |

(OR)

| | | | |
|---|---|---|---|
| 8. | a) | Explain Map projection types based on distortion characteristics | 7M |
| | b) | Mention advantages of raster data and limitation of vector data model. | 7M |

### UNIT-V

| | | | |
|---|---|---|---|
| 9. | a) | Explain the logical comparison operators in spatial analysis with example. | 7M |
| | b) | Explain preparation of Geomorphological Mapping Using Remote Sensing and GIS. | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 10. | a) | Explain overlay using a decision table. | 7M |
| | b) | How to prepare Land use and Land cover map using RS&GIS | 7M |

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# AR16

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
### IV B.Tech I Semester Regular Examinations, November-2019
## 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) 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 220V DC motor has Armature resistance of 0.5Ω. it is drawing Armature current of 15A. Motor is braked by Dynamic braking when it is running under full load. Find the Braking Resistance to be inserted to limit the Braking current to 10A.  7M

**(OR)**

2. a) Describe plugging method in a separately excited dc motor with relevant circuit diagrams?  7M

   b) A 220V, 150 rpm, 50A DC separately excited motor has an armature resistance of 0.5Ω is fed from a circulating current mode dual converter with 3-phase ac source voltage of 165V (line). Determine converter firing angles for the following operating conditions.
   i) Motoring operation at rated motor torque and 1000rpm.
   ii) Braking operation at rated motor torque and -1000rpm.  7M

### UNIT-II

3. a) Discuss the operation of a separately excited dc motor fed by a single phase semi-converter? Draw the speed torque characteristics of such a motor with variation of firing angle $\alpha$.  7M

   b) A separately excited DC motor of 220V, 1200rpm, and 8A has armature resistance of 0.75Ω. it is fed from a single phase fully controlled bridge rectifier whose source voltage is 230V,50Hz. Assume load current to be continuous determine the following.
   i) motor speed at $\alpha= 45^0$ and torque of 8N-m,
   ii) Developed Torque at $45^0$ and speed of 800rpm.  7M

**(OR)**

4. a) Discuss the operation of a three phase full converter fed DC drive(separately excited)  10M
   b) Explain advantages and applications of a three phase semi-converter.  4M

### UNIT-III

5. a) Derive and draw the speed- Torque characteristics of DC separately excited motor connected to Class-B chopper?  7M

   b) A Separately excited DC motor with armature resistance of 0.01Ω with DC supply of to 220V, 100A, 1000 rpm is Now Operated in dynamic braking with Chopper control with a braking resistance of 2 Ω
   (i) Calculate duty ratio of the Chopper for a motor speed of 500 RPM and braking torque of 1.5 times the rated value.
   (ii) What will be the motor speed for a duty ratio of 0.5 and motor torque equal to 1.5 times its rated torque?  7M

**(OR)**

6. Draw the circuit diagram and explain the operation of closed-loop speed control with inner-current loop and field weakening?  14M

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

   b) A 3-phase 50kw 1475rpm 420V 50HZ 4-pole star-connected induction motor has the following data: $R_s=0.4\Omega$, $R_r=0.21\Omega$, $X_s=0.95\Omega$, $X_r=0.85\Omega$ $X_m=32\Omega$ all quantities being referred to the stator side. If the frequency increased to 58HZ by frequency control, determine (a) The slip at maximum torque (b) The speed at maximum torque (c) The break down torque  7M

**(OR)**

8. Draw and explain the speed-torque curves for a three phase induction motor.  14M
   i.  Voltage control  ii) Frequency control  iii) Operation at constant (V/f) ratio.

**UNIT-V**

9. a) Describe separate control mode of Synchronous motor?  5M

   b) A 440V, 3 phase, 50 Hz, 6 pole, 945 rpm, delta connected Induction Motor has the following parameters referred to the stator. $R_s = 2\Omega$, $R_r = 2\ \Omega$, $X_s = 3\ \Omega$, $X_r = 4\ \Omega$. When driving a fan load at rated voltage it runs at rated speed. The motor speed is controlled by stator voltage control. Determine motor terminal voltage, current and torque at 800 RPM.  9M

**(OR)**

10. a) Draw and explain the circuit diagram of a separate controlled synchronous motor fed from a three phase inverter.  7M

    b) What is the difference between true synchronous mode and self control mode for variable frequency control of synchronous motor?  7M

# AR16

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**IV B.Tech I Semester Regular Examinations, November-2019**

**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) | Summarize the working principle of piston pump. | 7M |
| | b) | List out the important specification of hydraulic pump | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 2. | a) | Distinguish between single acting and double acting actuators | 7M |
| | b) | Explain the construction and working principle of gear pump. | 7M |

## UNIT-II

| | | | |
|---|---|---|---|
| 3. | a) | Illustrate the use of pressure relief valve in a hydraulic system? State the basic types of pressure relief valve. | 7M |
| | b) | Explain spring loaded accumulator with help of neat sketch. | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 4. | a) | With the help of neat sketch explain how pilot operated check valve differ from a simple check valve | 7M |
| | b) | Analyse how unloading valve differ from a sequencing valve in mechanical construction with schematic diagram. | 7M |

## UNIT-III

| | | |
|---|---|---|
| 5. | Prepare a schematic diagram for meter in and meter out flow control system. | 14M |

**(OR)**

| | | | |
|---|---|---|---|
| 6. | a) | Explain the hydraulic cylinder be designed so that for the same pump flow, the extending and retracing in speeds will be equal? | 7M |
| | b) | With the neat sketch explain plastic injection moulding circuit | 7M |

## UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | With the help of neat sketch explain about various reciprocating compressor | 7M |
| | b) | Write short notes on various components of air preparation systems | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 8. | a) | Write short notes on pneumatic actuators | 7M |
| | b) | Write short notes on various types of direction control valves | 7M |

## UNIT-V

| | | | |
|---|---|---|---|
| 9. | a) | Write short notes on numbering systems used pneumatic circuit design | 7M |
| | b) | Write short notes on speed control valves | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 10. | | With the help of circuit diagrams explain the difference between time delay valve and pressure sequence valve | 14M |

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**CODE: 16CS4024**                                                                                    **SET-2**

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
### IV B.Tech I Semester Regular Examinations, November,2019

## UML & DESIGN PATTERNS
### (Common to CSE & 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. | a) | What are the common modelling techniques of object diagram? Explain | 7M |
| | b) | What is a class diagram? Draw the class diagram for College Information System | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 2. | a) | Define Relationship? Explain the four adornments that apply to an association and dependency? | 7M |
| | b) | Draw and Explain Object diagram that contain a three level hierarchy of objects | 7M |

### UNIT-II

| | | | |
|---|---|---|---|
| 3. | a) | Explain the FORK and JOIN of an activity diagrams? | 7M |
| | b) | What is a use case diagram? Draw the use case diagram for online bookshop system. | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 4. | a) | Draw and explain a Sequence Diagram that specifies the flow of control involved in initiating a simple ,two- party phone call? | 7M |
| | b) | Explain about interaction diagrams with example | 7M |

### UNIT-III

| | | | |
|---|---|---|---|
| 5. | a) | Give the deployment diagram for client server 2 tier, event registration System | 7M |
| | b) | What is an event? Explain how to model different kinds of events in UML? | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 6. | a) | Draw a state chart diagram using sequential sub states and concurrent sub states? | 7M |
| | b) | Explain the steps to model executables and source code using component diagrams? | 7M |

### UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | Using a general example, explain how design patterns can be used to solve a problem? | 7M |
| | b) | Explain with a neat diagram the Design Pattern relationships? | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 8. | a) | List and explain the four essentials elements of pattern? | 7M |
| | b) | Explain the steps involved in applying design pattern effectively? | 7M |

### UNIT-V

| | | | |
|---|---|---|---|
| 9. | a) | Write the structure of Abstract Factory pattern and explain the participants that participate in it? | 7M |
| | b) | Explain the useful techniques for implementing abstract factory pattern? | 7M |

**(OR)**

| | | | |
|---|---|---|---|
| 10. | a) | Write in detail about Chain of responsibility behavioural pattern. | 7M |
| | b) | Explain in detail Bridge pattern? | 7M |

# AR13

## CODE: 13EE4022                                          SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**
**(AUTONOMOUS)**
**IV B.Tech I Semester Supplementary Examinations, November-2019**

**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) State and explain the functions of various converters.
   b) List out the drawbacks of rectifier fed DC drive.
   c) What is dynamic braking?
   d) What is the operation of converter in third and four quadrants?
   e) What are the types of the DC chopper drives?
   f) Explain regenerative braking.
   g) What are the limitations of v/f control?
   h) What is constant power mode operation?
   i) What is slip power recovery system?
   j) What are the possible methods to provide variable voltage variable frequency to synchronous motor fed from VSI?

### PART-B

Answer one question from each unit                         [5x12=60M]
### UNIT-I

2. a) Derive an expression relating speed and torque of a single phase full converter fed separately excited DC motor drive operating in the continuous current mode.
   b) What are the advantages of three phase drives over single phase drives

**(OR)**

3. a) Explain the use of freewheeling diode in the converter fed DC drives. Take an example of 1-phase fully controlled converter fed for explanation. How it is going to affect the machine performance.
   b) Draw the power circuit diagram and explain the operation of a three phase half controlled converter fed separately excited DC motor.

### UNIT-II

4. a) Describe the relative merits and demerits of the following types of braking for DC motors, mechanical braking, dynamic braking and regenerative braking with neat diagram.
   b) Explain the principle of closed-loop control of a DC drive using suitable block diagram.

**(OR)**

5. a) Explain how four-quadrant operation is achieved by dual converter each of 3-phase full wave configuration for DC separately excited motor.
   b) Draw and explain the torque-speed characteristics for dynamic braking operation of DC series motor..

# AR13

## UNIT-III

6        Explain the operation of the two quadrant chopper fed DC drive system

**(OR)**

**7.** a)    Distinguish between Class A and Class B choppers with suitable examples of
           speed control of motors.
    b)    Describe the working of a single quadrant chopper fed DC series motor drive.

## UNIT-IV

8. a)    Mention some applications of stator voltage control of three phase induction motor
   b)    Why the speed control of a three phase induction motor with constant supply
         voltage and reduced supply frequency is not preferred.

**(OR)**

9. a)    Using 3-phase solid state AC voltage controllers explain clearly how it is possible
         to achieve 4-quadrant operation of 3-phase induction motors.
   b)    Describe the stator frequency control scheme for the speed control of three phase
         induction motors.

## UNIT-V

10. a)    What are the assumptions made in the static resistance control of wound rotor
          induction motors
    b)    Describe the open-loop and closed loop methods of speed control of a
          synchronous motor using VSI

**(OR)**

11. a)    Why rotor resistance control is preferred in low power crane drives.
    b)    Describe separate controlled mode and self-controlled mode of operation of a
          synchronous motor drive in detail and compare them

# AR13

Time: 3 Hours                                                             Max Marks: 70

## PART-A
**ANSWER ALL QUESTIONS**                                          **[1 x 10 = 10 M]**

1.   a)   List the various applications of fluid power.
     b)   Define an accumulator.
     c)   Where do you find the application of Intensifiers?
     d)   Define volumetric efficiency of hydraulic motor.
     e)   What are various types of seals used in fluid power?
     f)   Write any **one** desired property of air medium in pneumatic system ?
     g)   Define valve overlap.
     h)   What is the function of a pneumatic actuator?
     i)   Define PLC and its function.
     j)   A single acting pneumatic cylinder or a non-reversing air motor can be controlled by ---- way valve as the signal output unit. When a four way control valve is used one outlet port is ---------

## PART-B
**Answer one question from each unit**                                  **[5x12=60M]**

### UNIT-I
2.   a.   Differentiate hydraulic motor and hydraulic pump.                                6M
     b.   Explain the construction and working principle of gear pump.              6M

**(OR)**

3.   a.   How to estimate the performance of a motor.                                          6M
     b.   A hydraulic motor has a displacement of 120 cm$^3$, operates with a pressure of 100 bar   6M
          and has a speed of 2100 rpm. If the actual flow rate consumed by the motor is 0.004 m$^3$/s, and the actual torque delivered by the motor s 210 N-m find: i) Volumetric efficiency ii) Mechanical efficiency iii) Overall efficiency iv) Power developed by motor in kW.

### UNIT-II

4.        Classify hydraulic control valves. Explain with a neat sketch, how three way and four   12M
          way direction control valves operate.

**(OR)**

5.   a.   Explain spring loaded accumulator with the help of neat sketch.               8M
     b.   What are various applications of Intensifiers?                                          4M

### UNIT-III

6.        Explain various hydraulic circuits to control single-acting and double-acting cylinders   12M

**(OR)**

7.        Explain meter in and meter out in speed control of hydraulic cylinders.        12M

## UNIT-IV

8.  a.  45 mm diameter piston of the pneumatic cylinder of the fig. given below retracts 120    6M
        mm from its present position. ( $P_1$=2.5 bar (guage) $V_1$=310cm$^3$ ) due to the external
        load on the rod. If the part at the blind end of the cylinder is blocked, find the new
        pressure, assuming temperature remains constant.



    b.  Differentiate between hydraulic system and pneumatic system.                        6M

**(OR)**

9.      Explain the basic components of Pneumatic system with neat sketch and what are its    12M
        advantages and disadvantages

## UNIT-V

10.  a.  Differentiate between pneumatic circuit and hydraulic circuit diagram                6M
     b.   Explain the difference between hard wired control and PLC control.                  6M

**(OR)**

11.     Explain PE converter and PLC applications in fluid power system.                     12M

# AR13

CODE: 13EC4029                                                        SET-2

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
### IV B.Tech I Semester Supplementary Examinations, November-2019

## MICROWAVE ENGINEERING
### (Electronics & Communication Engineering)

Time: 3 Hours                                                    Max Marks: 70

## PART-A
ANSWER ALL QUESTIONS                                          [1 x 10 = 10 M]

1. a) Define characteristics impedance and write its expressions
   b) Write the resonant frequency of the rectangular waveguide.
   c) Define Faraday rotation
   d) Demonstrate the need of scattering parameters
   e) Define Beam coupling coefficient
   f) What are the assumptions made for the discussion of two cavity klystron
   g) Define the axial phase velocity of TWT
   h) Define Hull cut off Magnetic flux density
   i) Write the full form of IMPATT and TRAPATT
   j) Difference between Microwave transistors and Transferred Electron Devices

## PART-B

Answer one question from each unit                               [5x12=60M]
### UNIT-I

2. a) Interpretation of Phase velocity and Group Velocity                   6M
   b) Discuss about TE Mode of Rectangular waveguide                        6M
   **(OR)**
3. a) Analysis of TEM mode of rectangular waveguide with field representations   6M
   b) Derive the expression for cut-off frequency of Rectangular waveguide   6M

### UNIT-II

4. a) Derive the of scattering parameters of EH plane Tee                    5M
   b) Demonstrate the operation of Gyrator and Circulator                   7M
   **(OR)**
5. a) Derive the of scattering parameters of E plane Tee                     5M
   b) Discuss about the applications of Magic Tee                           7M

### UNIT-III

6. a) Explain the Construction of two cavity Klystron                        5M
   b) Velocity modulation process and obtain the appropriate expression for Velocity   7M
      modulation process of two cavity Klystron
   **(OR)**
7. a) Discuss about the Bunching process of Klystron Amplifier               5M
   b) Construction and operation of four cavity Klystron                    7M

**CODE: 13EC4029**                                                **SET-2**

### UNIT-IV

| | | | |
|---|---|---|---|
| 8. | a) | Construction and operation of TWT | 8M |
| | b) | Discuss about $\pi$ mode of operation of Magnetron | 4M |

**(OR)**

| | | | |
|---|---|---|---|
| 9. | a) | Discuss Magnetron construction and operation | 8M |
| | b) | Discuss about the necessities of slow wave structures and various types of slow wave structures | 4M |

### UNIT-V

| | | | |
|---|---|---|---|
| 10. | a) | Explain Construction and operation of Gunn diode with RWH Theory | 8M |
| | b) | Discuss about Attenuation Measurement | 4M |

**(OR)**

| | | | |
|---|---|---|---|
| 11. | a) | Demonstrate the construction of IMPATT diode and its operation | 6M |
| | b) | Discuss about various methods for measuring Impedance | 6M |

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