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

ENVIRONMENTAL ENGINEERING-i
(Civil Engineering)

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

PART-A

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

1.
   a) Applying chlorine to the water before and after treatment is called as
   b) Most desirable plume behaviour is
   c) Zone with heaviest pollution in a stream is
   d) Bacterium which converts ammonium ions to nitrites is
   e) Blue baby disease is caused due to
   f) Hindered Settling is the other name for
   g) Wastewater from kitchens and sinks is termed as
   h) According to Indian standards, the annual permissible limits for particulate matter PM_{10} in sensitive areas is
   i) Full form of ATP is
   j) Design life of Distribution system is

PART-B

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

UNIT-I
2. a. Explain briefly water quality and testing?   6M
   b. Describe briefly Comparison of sources of water from quality and quantity?   6M

(OR)

3. a. Discuss briefly factors affecting water quality?   6M
   b. Give brief note on Population forecasts?   6M

UNIT-II
4. a. Give brief note on sedimentation?   6M
   b. Describe briefly design factors?   6M

(OR)

5. a. Discuss briefly design of filters?   6M
   b. Explain briefly disinfection?   6M

UNIT-III
6. a. Explain briefly Hardy Cross and equivalent pipe methods service reservoirs?   6M
   b. Discuss briefly sluice valves?   6M

(OR)

7. a. Describe briefly scour valves and check valves water meters?   6M
   b. Discuss briefly pump house?   6M

UNIT-IV
8. a. Explain briefly examination of sewage?   6M
   b. Discuss briefly B.O.D. equation?   6M

(OR)

9. a. Describe briefly flushing tanks?   6M
   b. Give brief note on pumps and pump houses?   6M

UNIT-V
10. a. Describe briefly Sludge digestion?   6M
   b. Discuss briefly design of Digestion tank   6M

(OR)

11. a. Give brief note on sedimentation tanks ?   6M
   b. Discuss briefly trickling filters?   6M

CODE: 13EE4022   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Supplementary Examinations, January-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) What is meant by electric drive?
    b) Draw the schematic diagram of separately excited dc motor connected to semi-converter?
    c) What is meant by plugging?
    d) Define braking?
    e) If 'f' is the chopping frequency, then the duty ratio of chopper is
        _____
    f) The rms value of output voltage of a basic chopper is _____
    g) PWM technique in inverters is used for _____
    h) What is the drawback of Rotor resistance control method?
    i) List the different types of slip power schemes
    j) What is meant by self control mode of synchronous motors?

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

UNIT-I

2. a) Discuss the operation of a separately excited dc motor fed by a single phase full converter? Draw the speed torque characteristics of such a motor with variation of firing angle α. **(7M)**
    b) A separately excited dc motor running at 1200rpm is operated from a single phase fully controlled bridge converter with input voltage 320sin310t, emf of 100V and armature resistance of 5 ohms. SCR's are fired at firing angle 45^0 for every half cycle. Calculate (i) Armature current (ii) Motor torque **(5M)**

(OR)

3. a) Discuss the operation of a three phase semi converter fed DC drive(separately excited) **(8M)**
    b) A 220V,1500 rpm dc motor has armature resistance and inductance of 2Ω and 28.36mH respectively. It is controlled by a 3-phase fully controlled rectifier from an ac source operating at 50HZ.Calculate the ac source voltage required to get the rated voltage across the motor terminals when operating in continous conduction mode **(4M)**

UNIT-II

4. a) Describe with a proper circuit diagram the speed-torque characteristics of a separately excited dc motor, under dynamic braking. **(6M)**
    b) A 400V, 750 rpm, 70A dc shunt motor has an armature resistance of 0.3Ω when running under rated conditions, the motor is to be braked by plugging with armature current limited to 90A. What external resistance should be connected in series with the armature? Calculate the initial braking torque and its value when the speed is increased to 300rpm. **(6M)**

(OR)

5. Draw the circuit diagram and explain the operation of closed-loop speed control with inner-current loop and field weakening? **(12M)**

6. a) Describe how a four-quadrant drive can be obtained from a chopper-fed separately excited dc motor? (7M)

   b) A constant frequency TRC system is used for speed control of DC series motor from 220V supply. The motor is having armature and field resistance of 0.04Ω. The average current in the circuit is 125A and chopping frequency is 200Hz. Calculate the pulse width if the average value of back emf is 60V (5M)

(OR)

7. a) Describe the basic operation of a chopper drive for a separately excited dc motor in dynamic braking mode and draw the speed torque characteristics of the drive? (6M)

   b) A 230V, 1200 r.p.m., 15A separately excited motor has an armature resistance of 1.2Ω. Motor is operated under dynamic braking with chopper control. Braking resistance has a value of 20Ω.Calculate duty ratio of chopper for motor speed of 1000r.p.m. and braking torque equal to 1.5 times of rated torque. (6M)

UNIT-IV

8. a) Describe the method of speed control of an induction motor by V/F control and draw the speed torque characteristics? (6M)

   b) A three phase,50KW,1475rpm,420V,50HZ,4-pole star-connected induction motor has the following data:$R_1=0.4\Omega$, $R_2=0.21\Omega$,$X_1=0.95$ Ω, $X_2=0.85$ Ω, all quantities being referred to the stator side. If the frequency increased to 58HZ by frequency control, determine(i)Slip at maximum torque (ii) Speed at maximum torque(iii) Break down torque (6M)

(OR)

9. a) Using a diagram and torque speed curve, explain the stator voltage control scheme for the speed control of a three phase induction motor? (6M)

   b) A three phase ,star-connected,30hp,480V,sixpole,60HZ,slip ring induction motor has a stator resistance$R1=0.5\Omega$ and a rotor resistance referred to stator $R^1_2 =0.5\Omega$. 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%. (6M)

UNIT-V

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 (5M)

(OR)

11. a) Describe about separately controlled synchronous motor fed from VSI? (7M)

    b) The rotor of a 4-pole,50HZ wound-rotor induction motor has a resistance of 0.3Ω per phase and runs at 1440rpm at full load. Calculate the external resistance per phase which must be added to lower the speed to 1320rpm, the torque being the same as before. (5M)

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CODE: 13ME4026   **SET-2**

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

REFRIGERATION AND AIR CONDITIONING
(Mechanical Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

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

1. a) What is standard commercial ton of Refrigeration?
    b) Draw the reversed Carnot cycle on P-v and T-s diagrams
    c) A machine working on a Carnot cycle operates between 310 K and 250 K. Determine COP when it is operated as:
    A heat pump.
    d) Draw P-h and T-s diagram of vapour compression refrigeration cycle
    e) What is the Function of condenser in VCR?
    f) Mention the function of Hydrogen in a three fluid vapour absorption system
    g) What is working principle of Thermo-electric refrigeration
    h) Name the psychometric process used in summer air conditioning
    i) What is chemical formula of R-12?
    j) Define Relative Humidity.

PART-B

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

UNIT-I

2. a) What is Open Air Refrigeration Cycle?   4M
    b) The atmospheric air at pressure 1 bar and temperature -5°C is drawn in the cylinder   8M
    of the compressor of a Bell-Coleman refrigerating machine. It is compressed isentropically to a pressure of 5 bar. In the cooler, the compressed air is cooled to l5°C, pressure remaining the same. It is then expanded to a pressure of 1 bar in an expansion cylinder, from where it is passed to the cold chamber.
    Find : 1. the work done per kg of air, and
    2. C. O.P. of the plant.
    For air assume law for expansion, $PV^{1.2}$ =constant; law for compression, $PV^{1.4}$ =constant; and specific heat of air at constant pressure = 1 KJ/kg K.

(OR)

3. a) Write all Methods of Air Refrigeration Systems   4M
    b) A refrigerator working on Bell-Coleman cycle operates between pressure limits of   8M
    1.05 bar and 8.5 bar. Air is drawn from the cold chamber at 10°C, compressed and then it is cooled to 30°C before entering the expansion cylinder. The expansion and compression follows the law $PV^{1.3}$ = constant. Determine the theoretical C.O.P. of the system.

UNIT-II

4. a) Write down different Types of Vapour Compression Cycles. 4M
   b) The temperature limits of an ammonia refrigerating system are 25°C and -5°C gas. If the gas is dry at the end of compression, calculate the coefficient of performance of the cycle assuming no undercooling of the liquid ammonia. 8M

(OR)

5. a) Draw T-S and P-h diagram for VCR Cycle with Superheated Vapour after Compression. 4M
   b) A vapour compression refrigerator uses methyl chloride (R-40) and operates between temperature limits of - 10°C and 45°C. At entry to the compressor, the refrigerant is dry saturated and after compression it acquires a temperature of 60°C. Find the C.O.P. of the refrigerator. The relevant properties of methyl chloride are as follows : 8M

Saturation temperature in °C	Enthalpy in kl/kg		Entropy in kl/kg K	
	Liquid	Vapour	Liquid	Vapour
-10	45.4	460.7	0.183	1.637
45	133.0	483.6	0.485	1.587

UNIT-III

6. a) Write down Advantages of Vapour Absorption Refrigeration System over Vapour Compression Refrigeration System. 4M
   b) Explain about NH_3-H_2-H_2O VAR System 8M

(OR)

7. a) Compare Li-water and Ammonia –water vapour absorption refrigeration systems. 4M
   b) In an absorbtion type refrigerator, the heat is supplied to NH_3 generator by condensing steam at 2 bar and 90% dry. The temperature in the refrigerator is to be maintained at -5^{0}C Find maximum possible COP. If the refrigeration load is 20 tonnes and actual COP is 70% of the maximum COP, find the mass of steam required per hour. Take temperature of the atmosphere as 30^{0}C 8M

UNIT-IV

8. a) Explain the phenomena of Seebeck effect and Peltier effect 4M
   b) Explain the working of Thermoelectric Refrigeration. 8M

(OR)

9. a) Explain principle of Pulse Tube Refrigeration 4M
   b) Explain About Orifice Pulse Tube Refrigeration. 8M

UNIT-V

10. a) Define the term 'By-pass factor' used for heating and cooling coil. Also explain factors affecting BPF 4M
    b) Moist air at 30°C, 1.01325 bar has a relative humidity of 80%. Determine without using the psychometric chart Partial pressures of water vapor and air , Specific humidity , Specific Volume and Dew point temperature.(From table corresponding saturation vapour pressure is 0.042461 bar) 8M

(OR)

11. a) Define the term 'Effective Temperature'. Explain the factors affecting it 4M
    b) Explain about Electronic filters along with their advantages and drawbacks. 8M

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Supplementary Examinations, January-2019
DIGITAL IMAGE PROCESSING
(Electronics & Communication Engineering)

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

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

1. a) Define the terms sampling and quantization
    b) How an image is acquired from the scanner.
    c) Represent discrete wavelet transform of one variable.
    d) Explain about slant transform
    e) What is the difference between brightness and contrast
    f) What are the equivalent filters for image smoothing and sharpening.
    g) What is the difference between pseudo and full color image processing?
    h) What is meant by image degradation
    i) What are different segmentation algorithms
    j) Define coding redundancy

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

UNIT-I
2. a) Explain some of the basic relationships that exist between pixels in a digital image?   6M
    b) Assume that a 15m high structure is observed from a distance of 75m. What is the size of   6M
        the retinal image?

(OR)

3. a) Write a brief note about the components of image processing systems   6M
    b) What is the difference between binary image and gray level image and how gray level   6M
        image is converted to binary image.

UNIT-II
4. a) Explain the properties of Fourier transform.   6M
    b) With mathematical expressions discuss Haar transform and explain how it is useful in Image   6M
        processing.

(OR)

5. a) Obtain the HADAMARD transform matrix for N=8.   6M
    b) Discuss the salient features of Discrete Cosine transform?   6M

UNIT-III
6. a) Explain the procedure for histogram equalization. What are its characteristics?   6M
    b) Differentiate the spatial image enhancement and image enhancement in frequency domain?   6M

(OR)

7. a) What do you mean by Histogram matching? Explain.   6M
    b) Explain about image sharpening in frequency domain   6M

UNIT-IV
8. a) Explain the conversion from HSI to RGB color model.   6M
    b) Define image restoration. Explain the operation of inverse filtering   6M

(OR)

9. a) Give the schematic sketch of R G B color cube? Indicate the primary color vertices on the   6M
        cube.
    b) Explain in detail Constrained Least Squares Filtering.   6M

UNIT-V
10. a) How the inter pixel redundancy is differentiated from the coding redundancy   6M
        and psycho visual redundancy?
    b) Explain the concept of Thresholding in image segmentation and Discuss their   6M
        Merits and limitation

(OR)

11. a) Explain the two different types of image Compression Techniques and their applications   6M
    b) Explain the concept of edge linking by using global processing via the Hough Transform   6M

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CODE: 13CS4020   **SET-2**

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

UML AND DESIGNS PATTERNS
(Computer Science & Engineering)

Time: 3 Hours   Max Marks: 70

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

1. a) How an object is different from a class?
   b) Define Swim lane?
   c) How do you identify methods?
   d) Define Synchronous message?
   e) Differentiate between event and signal?
   f) Which UML Diagrams give a static view and which give a dynamic view of a system?
   g) When Extends association is used?
   h) Define Adapter?
   i) List out the uses of design Patterns?
   j) Define Composite pattern?

PART-B

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

UNIT-I

2. Explain in detail about conceptual model of UML   **12M**

(OR)

3. (a) Explain the UML's Structural Diagrams Briefly?   **6M**
   (b) Describe forward engineering and reverse engineering?   **6M**

UNIT-II

4. (a) Explain the steps to model flows of control by organization?   **6M**
   (b) Draw a collaboration diagram that specifies the flow of control involved in registering a student to course?   **6M**

(OR)

5. (a) Explain about various relationships possible among use cases?   **6M**
   (b) What are swim lanes? Explain with a Activity Diagram?   **6M**

UNIT-III

6. (a) Briefly Explain the four kinds of events modelled by UML?   **6M**
   (b) Draw a state chart diagram for library management system?   **6M**

(OR)

7. (a) Distinguish between nodes and components?   **6M**
   (b) Draw and explain a deployment diagram for student management system?   **6M**

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UNIT-IV

8. (a) Define design Pattern? Explain about design patterns in small talk MVC? **6M**
    (b) Explain briefly the catalogue of design patterns? **6M**

(OR)

9. Explain how design patterns solve design problems? Write the uses of design patterns. **12M**

UNIT-V

10. (a) Explain briefly about Adapter pattern? **6M**
     (b) Explain the implementation issues considered when applying bridge pattern? **6M**

(OR)

11. (a) List and explain the benefits and liabilities of chain of responsibility? **6M**
     (b) Explain briefly about command pattern? **6M**