AR13   SET 01

CODE:13CE2003

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Supplementary Examinations, March – 2015
ENGINEERING GEOLOGY
(Civil Engineering)

Time : 3 Hours   Max Marks: 70

PART – A

Answer all questions   [1X10=10]

1. a) What is petrology?
   b) What is meant by weathering?
   c) Define mineral?
   d) What is the significance of luster?
   e) What is the composition of granite
   f) What is hiatus?
   g) Define strike and dip
   h) What is hade?
   i) What is a geophysical anomaly?
   j) List the important geophysical methods used in civil engineering.

PART - B

Answer one question from each unit   [5 X12 = 60]

UNIT -I

2. Describe the following: i) Petrology ii) Structural Geology

(OR)

3.   a) Explain the role of Engineering geology in Civil Engineering.
    b) Write any two case histories of failure of structures due to geological draw backs

UNIT -II

4. a) What is the importance of study of minerals? Explain different methods of study of
       minerals with their merits and demerits.
   b) Describe the physical properties and chemical composition of the following minerals
           i) Quartz ii) Olivine iii) Augite

(OR)

5. Write a detailed note on the identification of minerals through their physical properties with
    suitable examples.

UNIT –III

6. a) Explain the geological classification of rocks
    b) Give the megascopic description of i) Granite ii)Basalt iii) Sand stone

(OR)

7. a) What are the common textures in igneous rocks? Explain them.
    b) Describe the structures in sedimentary rocks.

UNIT IV

8. a) With neat sketches explain the classification of faults.
    b) What is a joint? Explain the classification of joints.

(OR)

9. a) With suitable sketches explain the types of folds.
    b) What is an unconformity? How do they formed?

UNIT V

10. a) Explain the principles in the Gravity and Magnetic methods.
    b) Explain the radiometric method with neat sketches and lis the applications.

(OR)

11. a) Write a detailed note electrical resistivity method and its applications.
    b) Briefly explain the seismic refraction method.

AR13 SET 01

CODE:13EE2005
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Supplementary Examinations, March– 2015
ELECTRICAL MACHINES – I
(ELECTRICAL & ELECTRONICS ENGINEERING)

Time : 3 Hours **Max Marks: 70**
PART – A
Answer all questions **[1X10=10]**
1.a) Define co-energy and field energy.
   b) Define the relationship of co-energy with mechanical work done and force.
   c) Why field poles are mounted on the stator surface.
   d) Define resistance commutation
   e) What are the necessary conditions for parallel operation of DC shunt generators?
   f) Define critical field resistance in dc machines?
   g) What are the different components of dc machines from constructional point of view?
   h) What is critical loading? Which dc generators show drooping characteristics?
   i) Which dc motors offers high starting torque and easy braking capability?
   j) What do you mean by direct test? Give an example of direct test to estimate efficiency of a dc machines?

PART-B
Answer one question from each unit **[5 X12 = 60]**
UNIT-I

2.a) Explain the mechanical work done in singly excited system when armature is moving from open to closed position very slowly? Correlate mechanical force and co-energy?
 [6M]
   b) A 10 pole lap wound dc machines armature has a total of 200 conductors, each with a current carrying capacity of 10Aand resistance of 0.025 . The average induced emf per conductor is 10 V. Find the value of armature resistance, generated voltage and power rating of the dc machine. If the armature is rewound using a wave winding then find the armature resistance, generated voltage and power rating of the dc machines. [6M]
(OR)
3.a) Explain the construction of DC generator with neat diagram [8M]

   b) A long–shunt DC compound generator supplies 5 KW at 250V. The shunt field, series field and armature resistance are 250 , 0.75 and 0.5 respectively. Calculate the induced emf and load current. [4M]
UNIT-II

4.Describe the armature reaction in detail and explain how MNA or brush axis is shifted in the direction of rotation in case of generator and in the opposite direction in case of motor?
 [12M]
(OR)
5.a) Explain how interpoles and compensating winding improve commutation process? [4M]
   b) In a dc machine the coil undergoing commutation is having inductance 0.01 H and caries a current of 200 A. If the machine is running at 800 rev/min and there are 50 commutator segments in the machine, estimate the value of reactance voltage developed across the coil during commutation. [8M]

UNIT-III

6. a) Explain the process of voltage build up in dc shunt generator. What are the causes for failure of voltage build up in a self excited dc generator. [8M]

  b). A cumulatively compound dc generator is operating properly as a flat compounded dc generator. The machine is then shut down, and its shunt field connections are reversed.

   (i) If the generator is turned in the same direction as before, will an output voltage be built up at its terminals? Why or why not?

   (ii) Will the voltage build up for rotation in the opposite direction? Why or why not?

   (iii) For the direction of rotation in which a voltage builds up, will the generator be cumulatively or differentially compounded or self excited generator? [4M]

(OR)

7. a) What is the need of equalizer bars? Specify the necessary conditions for running two or more DC shunt generators in parallel. [4M]

  b) Two dc shunt generator are operating in parallel. Their no-load voltages are 260 V and Characteristics are linear. At 220 V, generator-1 can deliver 310 kW and generator-2 can Deliver 600 kW. Find the total load 'P' and load supplied by each at 250 V. [8M]

UNIT-IV

8. a) Derive the expression for Electromagnetic torque and back emf of a DC motor. [6M]

  b) On full load, a 200 V d.c. shunt motor takes 8 kW from supply mains. When running on no-load, its speed is 700 r.p.m. and takes 4 A. The field and armature resistance are 100 and 0.6 respectively. Calculate speed and torque on full load. [6M]

(OR)

9. a) Derive expression and explain the speed torque characteristics of

   (i) Shunt motor, (ii) series motor. [5M]

  b) Explain the operation of three point starter with neat diagram [7M]

UNIT-V

10. a) What are the different losses in a dc machines? State and proof the condition for maximum efficiency in motor. [4M]

  b) A 220 V d.c shunt motor has armature and field resistance as 0.8 and 200. During Swinburne's test, current drawn from the supply is found to be 2.5 A. Estimate the efficiency of the machine,

   (i) When it is running as a motor drawing a line current of 40 A from the 220 V supply.

   (ii) When it is running as a generator delivering a load current of 40 A at 220 V. [8M]

(OR)

11. a) Write short notes on experimental procedure for Brake test [6M]

  b) The following readings are obtained when obtained when doing a load test on DC shunt motor using a brake drum:-

Spring balance reading   10Kg and 35 Kg   diameter of the drum   40cm
Speed of the motor   950rpm   Applied voltage   200V
Line current 30A . Calculate the output power and efficiency. [6M]

CODE:13ME2006
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Supplementary Examinations, March – 2015
ENGINEERING METALLURGY AND MATERIAL SCIENCE
(MECHANICAL ENGINEERING)

Time : 3 Hours   Max Marks: 70
PART – A
Answer all questions   **[1X10=10]**

1. a) What are types of crystal imperfections?
    b) What is a solid solution?
    c) What is meant bycritical point?
    d) What is an eutectoid reaction?
    e) What are characteristics of pearlite structure?
    f) What are properties of stainless steel?
    g) What is meant by toughness?
    h) What is major difference between the engineering stress and true stress?
    i) Write down the different shapes of powder particles?
    j)What is meant by green compact?
PART-B

Answer one question from each unit   **[5 X 12 = 60 M]**

UNIT- I
2. (a) What are types of crystal imperfections and explain in details?
    (b) What are the characteristics of metallic bonding?
(OR)
3. (a) Explain interstitial compounds,inter metallic compounds and electron compounds?
    (b) Explain the following terms:
        (i) Covalent bond
        (ii) Packing density
        (iii) Hume Rothery rules for maximum solid solubility?

UNIT – II
4.   Explain Iron –Iron Carbide phase diagram indicating different phases?
(OR)
5. What are principlesof solidification and explain in detail?

UNIT- III
6. (a) What is meant by TTT Curves? Explain the TTT curve with different transformation
    (b)   What are types of hardening methods and explain in detail?
(OR)
7. Explain the classification of cast iron, mention their properties and applications?

UNIT – IV
8. Explain the engineering stress-strain curve for ductile material indicating all stages?
(OR)
9.   What is meant by creep and explain different stages creep mechanisms with neat
      diagram?
UNIT – V
10. (a) Identify at least three processes using molten metal is raw material to manufacture
         the powder particles and explain in detail?
    (b) What are metal powder characteristics influences the final product in powder
         metallurgy?
(OR)
11. Explain the manufacturing methods of connecting rod by powder metallurgy route?

CODE:13EC2005
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Supplementary Examinations, March – 2015
PROBABILITY THEORY AND STOCHASTIC PROCESSES
(Electronics and Communication Engineering)

Time : 3 Hours   **Max Marks: 70**
PART – A
Answer all questions   **[1X10=10M]**
1. (a) Define mutually exclusive events.
   (b) Write the statement of Addition theorem for two events.
   (c) Verify that the following is a distribution function.

$$F(x) = \begin{cases} 0 & ; x < -a \\ \frac{1}{2}\left(\frac{x}{a}+1\right) & ; -a \le x \le a \\ 1 & ; x > a \end{cases}$$

   (d) Define Binomial distribution.
   (e) Mention two applications of Poisson distribution.
   (f) Define joint probability density function.
   (g) What is a random process?
   (h) What is the difference between narrow band and broad band noises.
   (i) The noise figure of an amplifier at room temperature (T=290^0 K) is 0.2 dB find the
       equivalent temperature.
   (j) What are the different noise sources that may be present in an electronic device?

PART – B

Answer one question from each unit   **[5X12=60M]**
UNIT – I

2. a) (1) What are the axioms of probability?   [3M]
      (2) When two dice are thrown, find the probability of getting a sum of 10 or 11.   [3M]
   b) State and prove addition theorem of probability for two events.   [6M]

(OR)

3. a) If A and B are two events, prove that $\bar{A}$ and $\bar{B}$, $\bar{A}$ and B are also independent.   [6M]
   b) Three machines A, B and C produce respectively 60%, 30% and 10% of the total number of
      items of a factory. The percentage of defective output of these machines are respectively 2%
      3% and 4%.
      (i) Find the probability that the item is defective when randomly selected.
      (ii) Find the probability that the defective item is from the machine C.   [6M]

UNIT –II

4.a) Consider the experiment of tossing four fair coins. The random variable X is associated
       with the number of tails showing. Compute and sketch the cdf of X.   [6M]
  b) Define cumulative probability distribution function. Discuss distribution function specific
     properties.   [6M]

(OR)

5. a) What are the properties of Gaussian curve. [6M]
   b) Define and explain the following density functions.
   (i) Exponential $\qquad$ (ii) Uniform [6M]

UNIT – III

6. a) Two discrete random variables X and Y have joint pmf given by the following table.

$$
\begin{array}{c|ccc}
X/Y & 1 & 2 & 3 \\
\hline
1 & \frac{1}{12} & \frac{1}{6} & \frac{1}{12} \\
2 & \frac{1}{6} & \frac{1}{4} & \frac{1}{12} \\
3 & \frac{1}{12} & \frac{1}{12} & 0
\end{array}
$$

[6M]

Compute the probability of each of the following events.(i) X 1.5 (ii) XY even
(iii) Y is even given that X is even.

b) Define joint distribution function and its properties. [6M]

(OR)

7. a) The density function $f(x,y) = \frac{xy}{9}$ $\quad 0 < x < 2; \ 0 < y < 3$
   $\qquad = 0$ else where
   applies to two random variables X and Y. (i) Show that X and Y are stochastically
   independent. (ii) Show that X and Y are uncorrelated [8M]
   b) (i) Define Cauchy Schwartz inequality [2M]
   (ii) Define Central limit theorem. [2M]

UNIT – IV

8. Discuss in detail about (i) First order Stationary random process [6M]
   (ii) Wide dense stationary random process [6M]

(OR)

9. a) What is a Poisson random process? Explain. [8M]
   b)What are the properties of Poisson random process [4M]

UNIT – V

10. a) State and prove the properties of power spectral density. [8M]
    b) Find the PSD of a random process x(t) if $E[x(t)] = 1$ and $R_{XX}(\tau) = 1 + e^{-a|\tau|}$ [4M]

(OR)

11. a)Discuss about power spectral density of white noise. [8M]
    b)White noise n(t) with $G(f) = \frac{\eta}{2}$ is passed through a low pass RC network with a 3 dB
    frequency f_c. Find the autocorrelation $R(\tau)$ of the output noise of the network. [4M]

Code: 13EC2006
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Supplementary Examinations, March - 2015
DIGITAL LOGIC DESIGN
(Common to CSE and IT)

Time : 3 Hours   **Max Marks: 70**
PART – A

Answer all questions   **[1X10=10]**

1 a) Convert the given number with given base $(25.45)_{10} = (\ )_2$?
   b) What is field programmable logic array?
   c) Differentiate the prom with PLA.
   d) Define shift register.
   e) Find the 2's compliment of 1010110_2?
   f) What is the disadvantage with RS flipflop?.
   g) Distinguish between demultiplexers and decoders.
   h) What is the difference between half adder and full adder?
   i) Write down flip flop applications.
   j) Define a sequential logic circuit.

PART-B
Answer one question from each unit   **[5X2=60M]**
UNIT-I

2. (a) Explain different methods used to represent negative numbers in binary system.   [6M]
   (b) Given a Boolean expression $F = x'y + xyz'$:   [6M]
       (i) Derive an algebraic expression for the complement F'.
       (ii) Show that $F \cdot F' = 0$.
(OR)
3. (a) Simplify the following expressions using Boolean algebra.   [6M]
       (i) $AB + A(CD + CD')$
       (ii) $(BC' + A'D)(AB' + CD')$
   (b) Convert the following numbers with the given base
       i) $(87.42)_{10} = (\ )_8$. ii) $(7A .4B)_{16} = (\ )_{10}$ iii) 1010110_2 to gray code   [6M]

UNIT-II

4. (a) Simplify the following Boolean functions, using 4-variable maps   [6M]
       $wxy + yz + xy'z + x'y$
   (b) Simplify the following Boolean function F, together with the don't-care conditions d and
      then express the simplified function in sum of min terms.   [6M]
      $(F(A,B,C,D) = (1,3,5,7,9,15), d(A,B,C,D) = (4,6,12,13)$

(OR)

5. (a) Draw a NAND logic diagram that implements the complement of the following function.
     F(A, B, C, D)=   (0, 1, 2, 3, 4, 8, 9, 12)   [6M]
   (b) Explain the expression for the carry-output of a 4-bit carry look-ahead adder.   [6M]

UNIT-III

6. (a) Design a combinational circuit that compares two four-bit numbers to check equality. The
      circuit output is equal to 1, if the two numbers are equal and 0 otherwise.   [6M]
    (b) Explain the operation of 3 to 8 line decoder with help of a truth table.   [6M]
(OR)
7. (a) Implement a full adder with two 4 X 1 multiplexers.   [6M]
   (b) Using a decoder and external gates, design a combinational circuit defined by the
      following three Boolean functions.   [6M]
        (i) $F_1 = x'y'z' + xz$
        (ii) $F_2 = xy'z' + x'y$
        (iii) $F_3 = x'y'z + xy$

UNIT-IV

8. Derive the PLA programming table and the PLA structure for the combinational circuit that
   squares a 3- bit number. Minimize the number of product terms.   [12M]
(OR)
9. Tabulate the truth table for 8 x 4 ROM to input the following functions: [12M]
     (i) A= (1,2,4,6)   (ii) B= (0,1,6,7)   (iii) C= (2,6)

UNIT-V

10. (a) Design a 4-bit ring counter using T- flip flops and draw the circuit diagram and timing
       diagrams.   [6M]
    (b) Explain about the Following   [6M]
        (i) Serial addition in 4-bit shift register
        (ii) BCD Ripple Counter
(OR)
11. (a) Convert RS flipflop into JK flipflop.   [6M]
    (b) Explain the operation of a JK-flip flop using its block diagram and truth table. What are
       its limitations?   [6M]