AR13   SET 01

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, January, 2015
ENGINEERING GEOLOGY
(CIVIL ENGINEERING)

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

PART – A

Answer all the questions   [1X10=10]

1. a) What is weathering of rocks ?
   b) Distinguish between rock and mineral?
   c) Distinguish between lava and magma ?
   d) What is strike of rocks ?
   e) Distinguish between fault and joint ?
   f) Distinguish between fracture and cleavage of minerals ?
   g) What is the basic principle involved in electrical resistivity method ?
   h) What is diagnostic property of a mineral ?
   i) List down the tools / accessories required for identification of minerals using physical
      properties of minerals?
   j) Name any four geophysical methods used to reveal sub surface characteristics of the ground

PART-B

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

UNIT-I

2. a) Knowledge of engineering geology is very essential to a civil engineer. Justify the
      statement   [12M]
   b)Present a case history of failure of any major civil engineering structure due to geological
      drawbacks ?

(OR)

3. a) Give a brief note on significance of engineering geology in civil engineering point of view ?
   b) List down various branches of geology and give a brief on how knowledge of these
      subjects is useful to a civil engineer ?

UNIT - II

4. a) Give a brief note on various physical properties that are required to be studied for
      identification of minerals ?
   b) How do you distinguish feldspar and quartz with the help of physical properties of
      minerals?

(OR)

5. a)List down various methods available for identification of minerals ?Demonstrate on how do you identify the minerals with the help of various physical properties of minerals ?
   b)Write down the physical properties of the following minerals ?
     i.Talc
     ii.Hematite
     iii.Asbestos
     iv.Muscovite

UNIT -III

6. a)What are the types of rocks ? How do you distinguish these rock types in the field ?
   b)Give a brief note on textures of igneous rocks with neat sketches ?
(OR)
7. a) Give a brief note on textures and structures of sedimentary rocks with neat sketches ?
   b)High light on how the basic knowledge of petrology is useful in civil engineering?

UNIT - IV

8. a) Give a brief on various types of folds with neat sketches and highlight on significance of folds in civil engineering ?
   b) Distinguish between strike and dip of rocks with sketch? Highlight on significance of joints in civil engineering ?
(OR)
9. a) What are the parts of fold ? How is the basic knowledge of structural geology is useful in civil engineering ?
   b) Give a brief on various types of faults with neat sketches and highlight on significance of faults in civil engineering ?

UNIT - V

10. a) List down various geophysical methods available and highlight on their basic principle? What are the application of these methods in civil engineering ?
    b) Give a brief on electrical resistivity method of investigation along with its application in civil engineering ?

(OR)

11. a)Give a brief on seismic refraction method of investigation along with its application in civil engineering ?
    b) List down various geophysical methods available and highlight on their basic principle?

AR13 SET 01

CODE:13EE2005

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Regular Examinations, January – 2015
ELECTRICAL MACHINES – I
(ELECTRICAL & ELECTRONICS ENGINEERING)

Time : 3 Hours   Max Marks: 70

PART – A

Answer all questions   [1X10=10]

1. (a) What is the expression for the energy stored in a magnetic field system?

   (b) Express force and torque equation in double excited system.

   (c) What are the methods for improving commutation?

   (d) Distinguish between lap winding and wave winding.

   (e) Write the minimum requirements to build up of EMF in self excited dc generators.

   (f) What are the uses of equalizer bar in DC generators?

   (g) Write different methods of speed control in dc series motor.

   (h) Draw the speed torque characteristic of a DC compound motor.

   (i) Explain why a DC motor should not be started direct on line.

   (j) When did you say, DC motor had maximum efficiency?

PART – B

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

UNIT – I

2 (a) Derive the magnetic force & torque from energy.   [6 M]

  (b) Derive the expression for energy in the magnetic field of singly excited system.   [6 M]

(OR)

3 (a) Explain the principle of a DC generator with neat diagram   [6 M]

  (b) An 8-pole generator has 500 armature conductors and has a useful flux/pole of a 0.065 wb.
      What will be the emf generator if it is lap connected and runs at 1000 rpm? What must be
      the speed at which it is to be driven to produce the same e.m.f. if it is wave wound. [6 M]

UNIT – II

4 (a) Derive the expression for demagnetizing and cross magnetizing ampere turns per pole
                                                                                          [6M]

  (b) Explain how the commutation is improved by the inter poles.   [6M]

(OR)

5. Explain clearly the concept of Armature reaction process with neat diagrams   [12M]

UNIT – III

6 (a) Determine the internal characteristics from External characteristics of a DC shunt generator. [6 M]

(b) A 4 pole, DC series motor has lap connected armature winding with 600 conductors. When fed from 250V, the motor supplies a load of 10 KW and takes a line current of 50A. The flux per pole is 0.03 wb and runs at 3000rpm. The friction and iron losses are 500W. Calculate the armature torque and shaft torque developed by the motor. [6 M]

(OR)

7 (a) A 4 pole DC shunt generator supply a current of 143 A. It has 492 conductors on the armature lap connected while delivering full load: the brushes are given an actual lead of 10^0. Calculate the magnetizing ampere turns per pole. The filed winding is shunt connected and takes 10 A. Find the number of extra shunt field turns necessary to neutralize the demagnetization. [6 M]

(b) What are the necessary conditions for parallel operation of DC generators [6M]

UNIT – IV

8 (a) Derive the Torque equation for a DC motor?. [6 M]

(b) A 200 V, D.C shunt machine has an armature resistance of 0.5   and field resistance of 200 . The machine is running at 1000 rpm as a motor drawing 31 A from the supply mains. Calculate the speed at which the machine must be driven to achieve this as generator. [6 M]

(OR)

9 (a) Specify the necessity of Starters and explain the 3 point starters. [5 M]

(b) A 6-pole DC motor has a wave connected armature with 87 slots, each slot Containing 6 conductors. The flux per pole is 20 mwb and the armature has a resistance of 0.13Ω. When the motor is connected to 240 V supply and the armature draws a current of 80 A driving a load of 16 kW. Calculate (i) Speed (ii) Armature Torque and (iii) Shaft Torque. [7 M]

UNIT – V

10. (a) Derive the condition for maximum efficiency in a DC machine. [6 M]

(b) A brake test on a DC shunt motor gave the following results.
Weight on the brake drum = 4.5 kg and 0.5 kg. Radius of the pulley = 12cm. Speed of the motor = 1200 rpm. Line current = 3.7 A, Supply voltage = 200 V. compute the output torque and efficiency of the motor. [6 M]

(OR)

11. (a) What is the effect of losses on the performance of dc motors? [6 M]

(b) A 220V, 12KW, DC shunt motor has a maximum efficiency of 90% and a speed of 800 rpm. When delivering 80% of its rated output. The resistance of the shunt field is 80 ohm. Determine the efficiency, Speed when the motor draws a current of 70 A from mains. [6 M]

AR13   SET 02

CODE:13ME2006
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Regular Examinations, January – 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 miller Indices.

    (b) Define Yield Point.

    (c) Write about Intermediate , Intermetallic and Interstitial Compounds.

    (d) What is the purpose of Heat treatment

    (e) What is Gibbs Phase rule and what it indicate

    (f) Discuss the Reactions occcur in Iron – Carbide diagram.

    (g) Mention a few nickel based alloys with applications.

    (h) What is malleability.

    (i) What are Brass and Bronze.

    (j) Write the Design Considerations of Powder Metallurgy.

PART – B

UNIT-I

Answer one Question from Each Unit   **[5 X 12 = 60M]**

  2. What is Atomic Packing Factor and calculate APF for HCP Structure.
(OR)
  3. Write about the formation of dislocations in Crystals and discuss the differences between Slip and Twinning.
UNIT-II
  4. What is an Eutectic Reaction and Plot the Equilibrium diagram for Bi – Cd System to a scale and find (i) Amount of eutectic in 20% Cd alloy and (ii) Free Cd in 70% alloy with the following data Melting temperature of Bi is 271^0C ; Melting temperature ofCd is 321^0C ,Eutectic Temperature is 144^0C ; Eutectic Composition is 39.7 % Cd.
(OR)
  5. Discuss Pearlitic and Martensitic transformations in detail.

UNIT-III
  6. Explain TTT Curves .
(OR)
  7. Describe the structure of aluminium and Write its alloys with applications

UNIT-IV
  8. (a) Write a Short note on Fracture Testing.
     (b) Write a short note on Fatigue Testing.
(OR)
  9. What is an Engineering Stress – Strain Curve , True Stress – Strain curve and also write the relation between the two.

UNIT-V
  10. Explain the Sintering and compacting processes of Powder metallurgy .
(OR)
  11. Discuss the advantages and Drawbacks of Powder metallurgy over other manufacturing process. Mention few applications of Powder Metallurgy Process.

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AR13   SET 01

CODE:13EC2005

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Regular Examinations, January – 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 discrete random variable
   (b) Define conditional probability.
   (c) Define Independent Events.
   (d) Define Mathematical Expectation .
   (e) Define Probability density function.
   (f) If the probability density function of a random variable is
       $f(x)=kx^3$, 0<x<1, find the value of k.
   (g) Define Rayleigh distribution
   (h) Define joint cumulative distribution function
   (i) Define Ergodicity
   (j) Define White noise.

PART-B

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

UNIT-I

2. a) Explain the following i) Equally Likely events
                             ii) Mutually Exclusive events
                             iii) Exhaustive Events
   b) Find the probability of drawing a Queen, a King, and a Jack in that order from a
      pack of cards in three consecutive draws , the cards drawn not being replaced.
                              (OR)
3. a) State and Prove Baye's theorem
   b) A bag contains 100 balls numbered from 1 to 100. If a ball is taken at random ,
      what is the probability of having a ball with a number which is a multiple of either
      3 or 5 ?

UNIT-II

4 a) If the probability density function of x is $f(x) = kxe^{-4x^2}$,if x>0. Find the value of k
   b) A car hire firm has two cars, which it hires out day by day. The number of
      demands for a car on each day is distributed as a Poisson distribution with mean
      1.5. Calculate the proportion of days on which neither car is used and the proportion
      of days on which some demand is refused.

(OR)

5. a) Explain the concept of mathematical expectation of a random Variable.

   b) A continuous random variable has a density function $f(x)=3x^2; 0 \ x \ 1$.
   find a and b such that i)$P(x \ a) =P(x>a)$ ii) $P(x>b)=0.5$

UNIT-III

6 a) Define joint probability density function and write the properties.

   b) Find the marginal density functions of X and Y with joint probability density function

$$f(x,y)=\frac{6-x-y}{8}, \quad \text{if } 0 \le x \le 2 \text{ and } 2 \le y \le 4.$$

.

(OR)

7 a) State and prove central limit theorem

   b) Given $f(x,y)=\frac{2}{3}(x+2y)$ 0<x<1, 0<y<1. Find the conditional probability of

   x/y and y/x.

UNIT-IV

8 a) Write a short notes on Poisson random process .

   b) If particles are emitted from a radio active source at the rate of 20 per hour, find the
   probability that exactly 5 particles are emitted during a 15 minute period.

(OR)

9 a) Write the properties of Auto correlation.

   b) Find the mean and variance of stationary random process whose auto correlation

   function is given by $R_{xx}( )=18+\dfrac{2}{6+ {}^2}$

UNIT-V

10 a) Define power spectral density and write its properties.

   b) For a random process X(t)=Acos(t+) where A is a real constant, is a random
   variable with density f( ) and is a random variable uniformly distributed over the
   interval (- ,) and independent of , calculate the power spectral density.

(OR)

11 a) Write the properties of cross density spectrum.

   b) Show that if Y(t)= X(t+a) - X(t+a) , then $R_{yy}( )=2R_{xx}( ) – R_{xx}(+2a) – R_{xx}(-2a)$

Code: 13EC2006

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Semester Regular Examinations, January - 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 number with the indicated base to decimal $(E\ A\ 4)_{16}$
   b) Find the 2's complement of $(1\ 0\ 0\ 1\ 1\ 0\ 0\ 0)_2$
   c) Simplify the Boolean function $xyz+x^1y+xyz^1$ to minimum number of literals
   d) Race around condition occurs in which flipflop?
   e) Which logical operation is called Odd function?
   f) List some applications of Multiplexers.
   g) List the applications of PLA?
   h) How many states a 6-bit ripple counter can have?
   i) How many flip flops are required for a Decade counter?
   j) How many bits can be stored in a flip flop?

PART-B

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

UNIT-I

2. a) convert the following
   (i) $(643.512)_{10}$ to excess-3 code   (ii) $(96.42)_{10}$ to BCD code
   (iii) $(110101)_G$ to binary code

   b) Perform the following operations using 2's complement method
   (i) $(1010)_2 – (1111)_2$ ii) $(1010)_2 – (1000)_2$ (iii) $(001110)_2+(110010)$ [6M+6M]

(OR)

3. Implement the Boolean function $F=xy+x^1y^1+y^1$

   (a) With AND and inverter gates
   (b) With NAND and inverter gates
   (c) With NOR and inverter gates   [4M+4M+4M]

UNIT-II

4. Obtain the minimal SOP expression for the given Boolean function using K-map
   F(A,B,C,D)= (0,1,4,6,8,9,10,12)+d(3,7,11,13,14,15) and draw the circuit using
   2-input NOR gates [12M]

(OR)

5. (a) Draw and explain the logic diagram of carry look ahead adder
   (b) Give the comparison between serial and parallel adders [8M+4M]

UNIT-III

6. (a) Design BCD to Gray code converter using Full adder circuits
   (b) Realize the F(W,X,Y,Z)= (0,1,4,7,9,12,14) using 1:16 De MUX [6M+6M]

(OR)

7. (a) Perform realization of Full Subtractor using de coder and logic gates
   (b) With the help of logic diagram and truth table, explain a 3 line to 8 line decoder
   [6M+6M]

UNIT-IV

8. Implement the following Boolean functions with a PLA having three inputs, four
   products and two outputs.
   $F_1(X,Y,Z)$= (0,1,2,4) $F_2 (X,Y,Z)$= (0,5,6,7)

(OR)

9. (a) Compare PROM, PAL and PLA with various performance parameters
   (b) Implement the following function using PAL
   F= m(0,2,3,7,9,11,15) [4M+8M]

UNIT-V

10. (a) Draw and explain the Master-Slave JK flip flop
    (b) Draw and explain the operation of Bi-directional shift register [6M+6M]

(OR)

11. (a) Design, draw and explain mod-6 counter
    (b) Show how BCD ripple counter can be implemented using flip flops [6M+6M]