AR13 SET 02

CODE:13CE2003

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

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

PART – A

Answer all questions [1X10=10]

1. a) What is engineering geology?
   b) What is an out crop?
   c) What is the composition of basalt?
   d) What is the significance of cleavage in the mineral identification?
   e) Define sills and dykes?
   f) What is unconformity?
   g) What is a slicken slide?
   h) What is a joint?
   i) What is a geophysical anomaly?
   j) Define geophysical investigation?

PART - B

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

UNIT –I

2. Explain the importance of the following.
   i) Petrology ii) Structural Geology

(OR)

3. a) Importance of geology from civil engineering point of view.
   b) Write any two case histories of failure of structures due to geological draw backs

UNIT –II

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

(OR)

5. Write down the physical properties and chemical composition of the following minerals
   i) Feldspar ii) Garnet iii) Muscovite iv) Calcite

UNIT –III

6. a) Explain the geological classification of rocks with examples.
   b) Describe the following rocks i) Granite ii) Shale

(OR)

7. a) Describe the common structures and textures in igneous rocks.
   b) Describe the structures in metamorphic rocks

UNIT IV

8. a) Write a detailed note on the classification of fold .
   b) Write a detailed note on classification of joints.

(OR)

9. a) Explain the classification of faults with neat sketches.
   b) How unconformities are formed ? Explain the types of unconformities

UNIT V

10 a) Explain the importance and principles of geophysical methods.
   b) Briefly explain the seismic refraction method and its civil engineering applications.

(OR)

11. a) Write a detailed note on electrical resistivity method and its uses.
    b) Explain the radiometric method and its applications

AR13

CODE: 13EE2005 **SET-1**

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

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

PART –A

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

1. a) Define field energy?
   b) What are the functions of yoke?
   c) Write the expression for demagnetizing AT/ pole?
   d) List any two methods of improving commutation?
   e) Mention any two conditions to build up emf?
   f) Write any two applications of dc shunt generator?
   g) What are the effects of demagnetisation in a dc motor?
   h) Write any two applications of dc series motor?
   i) Mention any two advantages of Hopkinson's test?
   j) What are the limitations of Swinburne's test?

PART –B

Answer one question from each Unit **[5 x 12 =60M]**

2. a) Derive the e.m.f equation of a DC generator.. [6M]
   b) Calculate the flux per pole required on full-load for a 50kW, 400v, 8-pole, 600 r.p.m dc shunt generator with 256 conductors arranged in lap- connected winding. The armature winding resistances is 0.1Ω, the shunt field resistance is 200 Ω and there is a brush contact voltages drop of 1 v at each brush on full load? [6M]

(OR)

3. a) Draw and explain fully the general block-diagram representation of an electromechanical energy conversion device. [6M]
   b) A 4-pole, long-shunt lap-wound generator supplies 25 KW at a terminal voltage of 500 v. The armature resistance is 0.03 ohm, series field resistance is 0.04 ohm and shunt field resistance is 200 ohm. The brush drop may be taken as 1.0 v. Determine the emf generated. Calculate also the number of conductors, if the speed is1200 rpm and flux per pole is 0.02 Weber. Neglect armature reaction. [6M]

(OR)

4. a) Explain with neat diagram, of armature reaction in a dc generator. [6M]
   b) A 250-v, 25-kw, 4-pole dc generator has 328 wave –connected armature conductors. When the machine is delivering full load, the brushes are given a lead of 7.2 electrical degrees. Calculate the cross magnetising amp-turns/pole. [6M]

(OR)

5. a) With neat diagrams explain the commutation process. [6M]
   b) A 4-pole, 50KW, 250-V wave –wound shunt generator has 400 armature conductors. Brushes are given a lead of 4 commutator segments. Calculate the demagnetisation ampere turns/pole, if shunt field resistance is 50 Ω.Also, calculate extra shunt field turns/pole to neutralize the demagnetisation. [6M]

6. The open circuit characteristics for a d.c shunt generator at 800 rpm is given by following data:

I_f amp	0	0.2	04.	0.65	1.02	1.75	3.15	5.00
E_a volts	10	40	80	120	160	200	240	260

(a)Determine the critical field resistance at 800 rpm and

(b)If the field winding resistance is 55Ω, find the range of field rheostat to vary the voltage from 200 to 250V, on open circuit at speed of 800 rpm. [12M]

(OR)

7. a) Explain the necessity of parallel operation of dc generators. [6M]

b) Explain the internal & external characteristics of dc series, compound generators. [6M]

8. Explain the characteristics of dc shunt, series and compound motors and also mention the application based on their characteristics. [12M]

(OR)

9. a) Explain different speed control methods in dc series motor. [6M]

b) A 460-v series motor runs at 500 rpm taking a current of 40A. Calculate the speed and percentage change in torque if the load is reduced so that the motor is taking 30A. Total resistance of the armature and field circuits is 0.8 Ω. Assume flux is proportional to the field current. [6M]

(OR)

10. a) Explain a suitable test to find constant losses of a dc shunt motor. [6M]

b) The Hopkinson's test on two similar shunt machines gave the following full load data:

Line voltage =110V field currents are 3 A and 3.5A

Line current =48A Arm. resistance of each is 0.035 Ω

Motor arm. Current =230A

Calculate the efficiency of each machine assuming a brush contact drop of 1 volt per brush. [6M]

(OR)

11. a) Explain how stray losses are determined using retardation test. [6M]

b) When running on no – load, a 400 –v shunt motor takes 5A. Armature resistance is 0.5 Ω and field resistance is 200 Ω.Find the output of the motor and efficiency when running on full load and taking a current of 50 A. Also, find the percentage change in speed from no-load to full load. [6M]

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CODE: 13ME2006 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular / Supplementary Examinations, December - 2015
ENGINEERING METALLURGY & MATERIAL SCIENCE
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

PART – A

Answer all questions **[10x1 = 10M]**

1. (a) What is dendrite structure?
   (b) What is austenite?
   (c) What is Ionic Bond?
   (d) List out the advantages of martempering over hardening.
   (e) What is grain refinement?
   (f) What is eutectic reaction?
   (g) What is meant by creep?
   (h) Sketch normalizing range on the iron – iron carbide phase diagram. .
   (i) What is meant by fatigue?
   (j) What is the purpose of alloying?

PART – B

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

UNIT – I

2. (a) What is the significance of the dislocations?
   (b) Explain different types of dislocations briefly.

(OR)

3. (a) Classify solid solution and briefly explain them.
   (b) Explain why fine grained materials have superior properties than coarse grained materials?

UNIT – II

4. Draw the phase diagram of two metals completely soluble in the liquid state but only partly soluble in the solid state and explain the salient points.

(OR)

5. What are the principles and mechanisms of solidification.

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CODE: 13ME2006 **SET-1**

UNIT – III

6. (a) Explain T T T curves.
   (b) What are the methods of Hardening? Explain them briefly.

(OR)

7. (a) Define and distinguish Annealing and Normalizing.
   (b) Write the properties and applications of aluminium and its alloys.

UNIT – IV

8. List out various Hardness testing methods. Explain stress - strain curve of a mild steel work piece and explain the important points.

(OR)

9. What is meant by Creep? Explain different Creep mechanisms.

UNIT – V

10. Write about characteristics of metal powders. Explain the applications and advantages of Power metallurgy. .

(OR)

11. Explain the manufacturing methods of Power Metallurgy Components.

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CODE: 13EC2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular / Supplementary Examinations, December - 2015

PROBABILITY THEORY & STOCHASTIC PROCESSES
(ELECTRONICS AND COMMUNICATION ENGINEERING)

Time:3 hours **Max Marks: 70**

PART-A

Answer all questions **[10 x 1= 10M]**

1. a) Consider a telegraph source generating two symbols: dot and dash. We observed that the dots were twice as likely to occur as the dashes. Find the probabilities of the dots occurring and dash's occurring.

b) What is the necessary and sufficient condition for two events to be statistically independent?

c) A binary source generates digits 1 and 0 randomly with probability 0.6 and 0.4 respectively. What is the probability that two 1's and three 0's will occur in a five digit sequence?

d) The PDF of a random variable 'X' is given by

$$f_X(x) = \begin{cases} k & a \le x \le b \\ 0 & otherwise \end{cases}$$

where 'k' is a constant. Determine 'k'.

e) Let Y=2X+3.If a random variable 'X' is uniformly distributed over **[-1,2].Find** $f_Y(y)$.

f) Define Joint characteristic function.

g) Define ergodic random process.

h) Write any two properties of autocorrelation function.

i) Give the relationship between output power spectral density and input power spectral density of an LTI system.

j) Define noise figure.

PART-B

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

UNIT-I

2.a) A lot of 100 semiconductor chips contains 20 that are defective. Two chips are selected at random, without replacement from the lot. [6M]

(i)What is the probability that the first one selected is defective?

(ii)What is the probability that the second one selected is defective given that the first one was defective.

b) State and prove Bayes theorem? [6M]

(OR)

3. a) In a binary communication system a 0 or 1 is transmitted. Because of channel noise a 0 can be received as 1 and vice versa. Let m_0 and m_1 denote the events of transmitting 0 and 1 respectively. Let

r_0 and r_1 denote the events of receiving 0 and 1 respectively. [6M]

Let $P(m_0) = 0.5$, $P(r_1/m_0)=p=0.1$ and $P(r_0/m_1)=q=0.2$

(i) **Find $P(r_0)$ and $P(r_1)$.**

(ii) Calculate the probability of error **'P_e'.**

(iii) Calculate the probability that the transmitted signal is correctly read at the receiver.

b) Consider the experiment of selecting items from a group consisting of three items {a,b,c}. [6M]

(i) Find the sample space S_1 of the experiment in which two items are selected without replacement.

(ii) Find the sample space S_2 of the experiment in which two items are selected with replacement.

UNIT-II

4. a) Suppose a discrete random variable X has the following probability mass function's

$P_X(1)=1/2$ $P_X(2)=1/4$ $P_X(3)=1/8$ $P_X(4)=1/8$ [6M]

Find and sketch the cumulative distribution function $F_X(x)$ of the random variable 'X'

b) State and prove any three properties of probability density function. [6M]

(OR)

5. a) Find the mean and variance of a Gaussian random variable [6M]

. b) Derive the Rayleigh probability density function from Gaussian probability density function. [6M]

UNIT-III

6. a) The joint probability density function of a bivariate random variable(X,Y) is given by

$$f_{XY}(xy) = \begin{cases} k(x+y) & 0 < x < 2 \\ & 0 < y < 2 \\ 0 & otherwise \end{cases}$$

Where k is a constant [6M]

(i) Find the value of 'k'

(ii) Find the marginal probability density functions of x and y

(iii) Are X and Y independent.

b) State and prove central limit theorem. [6M]

(OR)

7. a) Find the density function of a sum of statistically independent random variables. [4M]

b) Two Gaussian random variables X_1 and X_2 have zero means and variances $\boldsymbol{\sigma_{X_1}^2 = 4}$ ***and*** $\boldsymbol{\sigma_{X_2}^2 = 9}$.Their covariance equals 3.If X_1 and X_2 are linearly transformed to new variables Y_1 and Y_2 according to $\mathbf{Y_1=X_1-2X_2, Y_2=3X_1+4X_2}$.Find the means, variances and covariance of Y_1 and Y_2.[8M]

UNIT-IV

8. a) Define a random process. Explain the classification of random process. [6M]

b) State and prove any three properties of cross correlation function. [6M]

(OR)

9. a) Explain Gaussian and poisson random process. [6M]

b) Consider a random process X(t) defined by

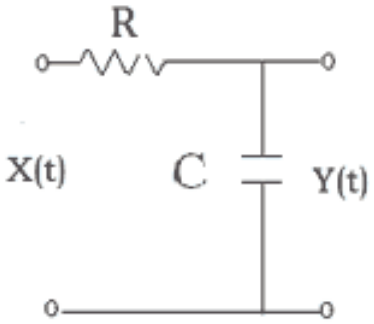
$$\boldsymbol{X(t) = U\cos t + V\sin t} \quad -\infty < t < \infty$$

Where U and V are independent random variables each of which assumes the values -2 and 1 with the probabilities 1/3 and 2/3 respectively. Show that X(t) is wide sense stationary but not strict sense stationary. [6M]

UNIT-V

10. a) State and prove any three properties of cross power spectral density. [6M]

b) The input X(t) to the RC filter shown in figure is a white noise.(i) Determine power spectral density of Y(t).(ii) Determine the auto correlation function of Y(t). [6M]



(OR)

11. a) Let **X(t) be a WSS** random process to an **LTI** system with impulse response **h(t) and let Y(t)** be the corresponding output process. Show that [6M]

$$\boldsymbol{R_{XY}(\tau) = h(\tau) * R_{XX}(\tau)}$$

$$\boldsymbol{R_{YY}(\tau) = h(-\tau) * R_{XY}(\tau)}$$

$$\boldsymbol{S_{YY}(\omega) = |H(\omega)|^2 S_{XY}(\omega)}$$

b) Find the relationship between noise figure and noise temperature of a cascaded network. [6M]

AR13 SET 01

Code: 13EC2006

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular / Supplementary Examinations, December - 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 $(2\ 4\ 6)_8$
   b) Find the 2's complement of $(1\ 1\ 1\ 1\ 1\ 1\ 1\ 1)_2$
   c) State the Demorgan's law
   d) Find the complement of $(x+y)^1\ (x^1+y^1)$
   e) How many Boolean functions can be generated with n variables
   f) Draw the circuit for 2-input X-OR gate using NAND gates
   g) How many half adders are needed to design a full adder?
   h) Write the name of the transparent flip flop
   i) The number of flip flops required for a mod-12 Johnson counter
   j) What is the basic memory element in a digital circuit?

PART-B

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

UNIT-I

2. (a) Explain weighted and Non weighted codes
   (b) Convert the following hexadecimal numbers into decimal
   (i) $(AE.6C)_{16}$ (ii) $(37F.2B)_{16}$ [4M+8M]

(OR)

3. (a) Express the following functions in sum of min-terms and product of max-terms.
   i) (xy+z) (y+xz) ii) B^1D+A^1D+BD

   (b) Draw the truth table and logic symbol for AND, OR, NOT gates [8M+4M]

UNIT-II

4. Simplify the following Boolean function using K-map
   (a) $F(W,X,Y,Z)=\sum(1,4,5,6,12,14,15)$
   (b) $F(A,B,C,D)=\sum(1,5,9,10,11,14,15)$ [6M+6M]

(OR)

5. (a) With the help of logic diagram explain a parallel adder/subtractor using 2's complement system.
   (b) Design a full adder using half adders and an OR gate. [7M+5M]

UNIT-III

6. (a) Implement the function $F(A,B,C,D)=\sum(0,1,3,4,8,9,15)$ with a multiplexer
   (b) Design a combinational circuit for an octal to binary encoder. [6M+6M]

(OR)

7. (a) A combinational circuit is defined by the following three functions
   $F_1=(xy)^1+xyz^1$ $F_2=x^1+y$ $F_3=xy+(xy)^1$
   Design the circuit with a decoder and external gates
   (b) List the applications of Multiplexer and Demultiplexer. [8M+4M]

UNIT-IV

8. A combinational circuit is defined by the function
   $F_1(A,B,C)=\sum_m(3,5,6,7)$ $F_2(A,B,C)=\sum_m(0,2,4,7)$

   Implement the circuit with a PLA having three inputs, four product terms and two outputs. [12M]

(OR)

9. (a) Design a BCD to excess-3 code converter using PAL
   (b) Differentiate the Programmable logic devices (PLDs) [8M+4M]

UNIT-V

10. (a) Convert a T flip-flop into D Flip-flop
    (b) Design, draw and explain a 4-bit ring counter using D- flip flop. [5M + 7 M]

(OR)

11. (a) Design, draw and explain the 4-bit universal shift register. [6M+6M]
    (b) Design, draw and explain a modulo -10 up asynchronous counter using T- flip flops.