AR13 SET 02

CODE :13CE2003

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular / Supplementary Examinations, November-2016

ENGINEERING GEOLOGY

(Civil Engineering)

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

PART – A

Answer all the questions [1X10=10]

1. a) Distinguish between symmetrical and asymmetrical folds ?
   b) Distinguish between texture and structure of rocks ?
   c) What is dip of rocks ?
   d) Distinguish between equigranular and inequigranular texture of rocks?
   e) Distinguish between lamination and bedding of rocks ?
   f) Distinguish between normal fault and reverse fault ?
   g) Distinguish between streak and fracture of rocks ?
   h) What are volcanic rocks ?
   i) What is the basic principle involved in seismic method ?
   j) List down any four rocks that can be used as road material and coarse aggregate ?

PART-B

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

UNIT-I

2. a) Give a brief on importance of engineering geology in civil engineering ?
   b) Present a case history of failure of any major civil engineering structure due to geological drawbacks ?

(OR)

3. a) Knowledge of engineering geology is very essential to a civil engineer. Justify the statement
   b) Illustrate how the basic knowledge of engineering geology is useful in establishment of proposed state capital of Andhra Pradesh near Vijayawada?

UNIT - II

4. a) Appraise the physical properties of minerals to be studied for identification of minerals in the field?
   b) Distinguish between rock and mineral ? Write down the physical properties of kayanite and asbestos minerals?

(OR)

5. a) Highlight on various physical properties of minerals required to be studied for identification of mineral ?
   b) Distinguish between rock forming minerals and economic minerals? How do you distinguish feldspar and quartz with the help of physical properties of minerals ?

UNIT - III

6. a) Distinguish between dykes and sills ? Give a brief on structures of igneous rocks ?
   b) What are the types of rocks ? How do you distinguish these rock types in the field ?

(OR)

7. a) Give a brief on classification of rocks ?
   b) Write down the megascopic description of granite and shale ? Why shale is considered as an incompetent rock as material of construction and foundation rock in construction ?

UNIT - IV

8. a) Give a brief on various types of faults with neat sketches and highlight on significance of faults in civil engineering ?
   b) Give a brief on various types of folds with neat sketches and highlight on significance of folds in civil engineering ?

(OR)

9. a) Give a brief on various types of joints ? Highlight on significance of joints in civil engineering ?
   b) What are the parts of fold ? Distinguish between strike and dip of rocks with sketch?

UNIT - V

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

(OR)

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

AR13

CODE: 13EE2005 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular / Supplementary Examinations, November-2016
ELECTRICAL MACHINES-I
(Electrical & Electronics Engineering)

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

PART-A

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

1. a) What is function of brushes in DC Machine?
   b) Define the term critical speed.
   c) What is the condition for maximum efficiency of DC Generators?
   d) What is the purpose of series motor?
   e) Define field energy.
   f) State the energy balance equation in the energy conversion process.
   g) What is the function of interpoles?
   h) How do you reduce the armature reaction effect in a D.C Machine?
   i) What is the purpose of starter in DC Machine?
   j) What is the advantage of the ward Leonard system?

PART-B

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

UNIT-I

2. a Derive a general expression for torque a system with permanent magnets. **5M**
   b For a singly excited magnetic system derive the relation for the magnetic energy stored in terms of reluctance **7M**

(OR)

3. a Mention the types of generators and write emf equations **5M**
   b Describe the constructional features of D.C generator **7M**

UNIT-II

4. a Derive expressions for De-magnetising, cross magnetising ampere turns/pole. **5M**
   b A 4-pole wave-wound motor armature has 880 conductors and delivers 120A. The brushes have been displaced through 3 angular degrees from the geometrical axis. Calculate (i) demagnetising amp-turns/pole (ii) cross-magnetising amp-turns/pole (iii) the additional field current for neutralizing the demagnetisation of the field winding has 1100 turns/pole. **7M**

(OR)

5. a Write short notes on effect of armature reaction. **6M**
   b What are the improving methods of commutation? 6M

UNIT-III

6. a Explain the necessity of parallel operation and state the conditions to be fulfilled for parallel operation. **4M**
   b Two DC generators are connected in parallel to supply a load of 1500A.One generator has an armature resistance of 0.05Ω and an EMF of 400volts .The resistance of shunt fields are 100Ω and 80Ω respectively. Calculate currents supplied by individual generators and its terminal voltage. **8M**

(OR)

7.		Six DC generators are running in parallel in a sub station, each having an armature resistance of 0.15Ω, running at the same speed and excited to give equal induced emfs. Each generator supplies an equal share of load of 360 KW at a terminal voltage of 500V into a load of fixed resistance. If the field current of one generator is raised by 5 percent, the others remaining unchanged, assuming the flux is proportional to field current and the speeds remains constant. Calculate new terminal voltage and output of each machine.	**12M**

UNIT-IV

8.	a	Derive torque equation of a D.C motor from first principles.	**5M**
	b	A DC motor has an armature current of 110A at 480volts.The armature circuit resistance is 0.24.The machine has 6 poles and armature is lap connected with 864 conductors. The flux /pole is 0.05Wb.Calculate the speed and the gross torque developed.	**7M**

(OR)

9.	a	Compare the Speed-Current, Torque-Current and Speed-Torque characteristics of a D.C shunt and series motors.	**6M**
	b	Explain with a neat diagram the working principal of three point starter.	**6M**

UNIT-V

10.	a	Discuss about Swinburne's test conducted on shunt and compound machines, what are advantages and dis-advantages of this test?	**7M**
	b	A 200volts shunt motor develops an output of 17.158KW when taking 20.2KW .The field resistance is 50ohms and armature resistance is 0.06ohms.What is the efficiency and power input when the output is 7.46KW.	**5M**

(OR)

11.	a	Explain the field test on D.C series motors.	**6M**
	b	A retardation test is carried out on 1000rpm D.C machine .The time taken for the speed to fall from 1030rpm to 970rpm in i) 36sec with no excitation ii) 15sec with full excitation iii) 9sec with full excitation and armature supplying extra load of 10A at 219V.Calculate 1) Moment of inertia of motor 2) Iron losses 3) The mechanical loss at max speed of 1000rpm.	**6M**

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AR13

CODE: 13ME2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular / Supplementary Examinations, November-2016

ENGINEERING METALLURGY & MATERIAL SCIENCE
(Mechanical Engineering)

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

PART-A

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

1. a) What are types of bonds in solid materials?
   b) Define intermediate alloy phases?
   c) What are invariant reactions in the iron-carbon phase diagram?
   d) Define hypo eutectoid reaction?
   e) What is meant by bainite transformation?
   f) What are types of titanium alloy?
   g) Write down the relation between true strain and engineering strain?
   h) What is difference between Izod and Charpy impact test?
   i) What is meant by impregnation process?
   j) What are the various shapes of powders?

PART-B

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

UNIT-I

2. a) Discuss the lattice relationship and unit cell geometry of seven crystal structures 8M
   b) Explain in details about point and line based crystal imperfections with neat diagram? 4M

(OR)

3. a) Explain about deformation mechanisms and strengthening mechanisms in structural materials? 8M
   b) Briefly explain about substitution and interstitial solid solution? 4M

UNIT-II

4. a) Draw the iron–carbon equilibrium diagram and label it. Show the invariant points on it and write the reactions occurring at theses points indicating the temperature and compositions of each phase? 8M
   b) Explain binary phase diagram with temperature, phases and composition. 4M

(OR)

5. a) Explain the mechanism of solidification of metals and alloys with microstructure diagram? 8M
   b) Explain the homogeneous nucleation with neat sketch? 4M

UNIT-III

6.	a)	Explain in detail about heat treatment of steel with all phase transformation?	8M
	b)	Draw a neat TTT diagram for eutectoid steel and indicate all the phases?	4M

(OR)

7.	a)	Describe about structure, composition, properties and applications of all types of steel?	8M
	b)	Compare grey cast iron with S.G. iron with respect to their structure, composition, properties and application?	4M

UNIT-IV

8.	a)	Explain in detail about stress strain curve of ductile and brittle material, and compare the both material with all the aspects?	8M
	b)	Show the procedure to conduct the tensile strength of given a material?	4M

(OR)

9.	a)	Define creep and explain the different stages of creep with typical creep curve?	8M
	b)	Draw the S-N diagrams for mild steel and aluminium and also discuss the same?	4M

UNIT-V

10.	a)	Explain in details about various types of powder generation processes with neat diagram.	8M
	b)	Describe about various secondary processes in powder metallurgy process.	4M

(OR)

11.	a)	Discuss about design consideration for powder metallurgy process with neat diagram?	8M
	b)	Compare cold compaction and hot compaction in all aspects?	4 M

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AR13 SET 02

CODE:13EC2005

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI (AUTONOMOUS)

II B.Tech I Semester Regular / Supplementary Examinations, November-2016

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 sample space
   (b) Define continuous random variable.
   (c) Define an event.
   (d) Define Probability mass function.
   (e) Define conditional probability.
   (f) Define exponential distribution.
   (g) Define a cumulative distribution function
   (h) Define Poisson random process
   (i) Define band limited random process
   (j) Define ergodicity.

PART-B

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

UNIT-I

2. a) Explain the following i) Mutually Exclusive events
   ii) Independent events
   iii) Exhaustive Events
   b) A box contains 6 Red , 4 White and 5 Black balls. A person draws 4 balls at random. Find the probability that among the balls drawn there is at least one ball of each color.

(OR)

3. a) State and Prove Baye's theorem
   b) The contents of urns I, II and III are as follows:
   1 white, 2 black and 3 red balls
   2 white, 1 black and 1 red balls
   4 white, 5 black and 3 red balls.
   One urn is chosen at random and two balls drawn. They happen to be white and red. What is the probability that they come from urn I.

UNIT-II

4 a) If the probability density function of x is

$$f(x) = \begin{cases} k(1 - x^2), 0 < x < 1 \\ 0 \text{ otherwise} \end{cases}.$$

Find the value of k and the distribution function.

b) If the probability of a defective fuse from a manufacturing unit is 2%, in a box of 200 fuses, find the probability that
   i) exactly 4 fuses are defective
   ii) more than 3 fuses are defective

(OR)

5. a) Define cumulative distribution function and write the properties.
   b) Is the function defined as follows a density function?

$$f(x)=\begin{cases}\frac{1}{18}(3+2x), & \text{for } 2\le x\le 4\\ 0, & \text{elsewhere}\end{cases}$$

UNIT-III

6 a) Define joint probability density function, marginal density functions and conditional probability density functions..
   b) If the joint probability density function is

$$f(x,y)=Ae^{-x-y}, \quad \text{if } 0\le x\le y \text{ and } 0\le y\le\infty.$$

.

Find i) A ii) marginal density functions of x and y

(OR)

7 a) State and prove central limit theorem
   b) Given f(x,y)=k, 0<x<y<1. Find the conditional probability of x/y and y/x.

UNIT-IV

8 a) What are various types of random processes? Explain.
   b) A radio active source emits particles at the rate of 6 per minute in a Poisson process. Each emitted particle has a probability of $\frac{1}{3}$ of being recorded . Find the probability that at least 5 particles are recorded in a 5 minute -period.

(OR)

9 a) Write the properties of Cross correlation.
   b) Find the mean and variance of stationary random process whose auto correlation function is given by $R_{xx}(\tau)=25+\frac{4}{1+6\tau^2}$

UNIT-V

10 a) Define cross power density spectrum and write its properties.
   b) Given that the random process X(t)=10 cos(100t+φ) where φ is uniformly distributed random variable in the interval (-π,π). Show that the process is correlation -ergodic.

(OR)

11 a) With suitable examples explain
   i) noise figure ii) noise temperature iii) noise band width.
   b) The three stage amplifier have effective input noise temperatures T_{e1}=1350K, T_{e2}=1700K and T_{e3}=2600K. The respective available power gains are G_1=16, G_2=10, and G_3=6. Find the total effective noise temperature and justify the result.

AR13

CODE: 13EC2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular / Supplementary Examinations, November-2016

DIGITAL LOGIC DESIGN
(Common to CSE and IT)

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

PART-A

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

1. a) Find the complement of $F = X^1 YZ^1 + X^1 Y^1 Z$
   b) List the truth table for XOR & X-NOR gates
   c) Convert hexadecimal number $(AC5)_H$ into binary & decimal numbers
   d) Reduce the following Boolean function (AB'+AC')(BC+BC')(ABC)
   e) What are the advantages of tabulation method over k-map the simplification of logic functions
   f) Simplify of A(A+B) & A(B.C).
   g) Define standard (or canonical) SOP & POS.
   h) Simplify the Boolean function and implement using NAND gates $f(A,B,C)= AB+AC+A^1BC$
   i) Draw the schematic of R-S flipflop with NOR gates
   j) Write short note on types of ROMs and their applications. Difference between a PLA and ROM

PART-B

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

UNIT-I

2. a) Convert the following numbers **6M**
      i) $(5791)_{16} = (\ )_8$ ii) $(10100101)_2 = (\ )_8$
   b) Draw the AND, OR, EX-OR, EX-NOR gates with truth tables **6M**

(OR)

3. a) Following numbers operate addition and subtraction **6M**
      i) 1001011 ii) 7859 9's compliment
      0111000 8643
   b) $A^1 BC + AB^1C + ABC + ABC^1 + A^1 B^1 C^1$ draw the circuit using NAND gate **6M**

AR13

CODE: 13EC2006 **SET-2**

UNIT-II

4.	a)	The ripple adder / subtractor explain with neat diagram	**6M**
	b)	Obtain the product-of sums realization of the following junction and implement it using NAND gates after minimization $f(A,B,C,D)=\Pi(0,1,2,3,4,10,11)$	**6M**

(OR)

5.	a)	Construct a full adder circuit and truth table with expressions	**6M**
	b)	Determine the sum-of-products realization for the following using K-map. $F(A,B,C,D)=\sum m(0,3,5,7,8,9,12,13,14)+d(1,10)$	**6M**

UNIT-III

6.	a)	Describe the 4 to 1 multiplexer description of using F=)=$\sum$m(0,1,3)	**6M**
	b)	Show that more than one 2 to 4 decoder plus a gate switch matrix can be connected to form a 4 to 16 decoder.	**6M**

(OR)

7.	a)	What is a priority Encoder? Design a 4 to 2 line priority encoder and draw its neat circuit diagram & explain its operation with suitable example.	**6M**
	b)	Give the logic realization of 2-bit word comparator to compare two words $A=A_1 A_0$ and $B = B=B_1B_0$ in binary code.	**6M**

UNIT-IV

8.	a)	Design the combinational circuits that accepts 3 input and produce its 2's complements as output with the help of ROM	**6M**
	b)	Implement the function f_1= w'xy'z+ wxyz+wx'yz using PAL	**6M**

(OR)

9.	a)	Write short notes on the following: (i) Memory ROM (ii) EEPROM	**6M**
	b)	Implement the Boolean function F(x,y,z)= $\sum$m(1,2,3,5,7) using PAL.	**6M**

UNIT-V

10.	a)	Draw the schematic of R-S flipflop with negative edge triggered and give the truth table. Justify the entries in the truth table	**6M**
	b)	Design and realize a module-6 synchronous counter using JK flip-flops and NAND gates	**6M**

(OR)

11.	a)	Explain the different types of shift registers with neat diagram.	**6M**
	b)	Show how BCD ripple counter can be implemented	**6M**

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