Code: 9A05401

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
DATABASE MANAGEMENT SYSTEMS
(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Discuss about the evolution of data models.
  (b) List and explain different types of data models.

2 (a) Explain about specialization and generalization constraints.
  (b) Compare and explain single valued and multi valued attributes.

3 (a) What are the differences between select and project operations? Explain with examples.
  (b) Discuss about 1:M and M:N relationships with examples.

4   Explain about all the SQL functions in advanced SQL with syntax and example.

5 (a) Write a short note on MVD (Multivalued dependencies).
  (b) What are the inference rules for MVD? Explain.

6 (a) What is transaction? Explain about its properties.
  (b) Explain about 2-phase locking and lock granularity?

7 (a) What is immediate database modification and deferred database modification? Explain.
  (b) Explain about the concept recovery with concurrency transaction?

8   Explain multi - key file organization in detail?

*****

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
DATABASE MANAGEMENT SYSTEMS
(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Define structural independence. Why is it important? Explain.
   (b) Discuss about the external model with example.

2 (a) Discuss about the ternary relationship with example.
   (b) What is specialization hierarchy? Explain in detail with example.

3 (a) Discuss about: (i) System catalog. (ii) Data dictionary.
   (b) Discuss about any four set operators with example.

4 (a) What are the DML commands? Explain each with syntax.
   (b) Explain how the computed columns and column aliases work in select queries.

5 (a) If R = {A, B, C, D} and the functional dependencies are = {AB-> CE, E->AB, C->D}.
        Why R is in 2NF but not in 3NF? Explain?
   (b) Explain the following with examples:
           (i) Lossless join dependency.
           (ii) Dependency preservation.

6 (a) Explain the terms binary lock, shared lock/exclusive lock.
   (b) Explain about database recovery management.

7 (a) Explain how the immediate database modification and deferred database modification
        are used.
   (b) Discuss how the recovery can be done with concurrent transaction.

8   Explain the method of invented file organization.

*****

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
DATABASE MANAGEMENT SYSTEMS
(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain the database system environment with a neat diagram.
  (b) What are the advantages of external model? Explain.

2   How to develop an ER diagram? Write steps for developing an ERD with example?

3   Consider a table and perform the queries using all the set operators on that table.

4 (a) What is a database schema and what are the data types that are used in data definition commands?
  (b) How to use updatable views? Explain.

5 (a) What is the dependency preservation property for decomposition? Which one must be definitely satisfied between the properties of dependency preservation and lossless? Why?
  (b) Why is 4NF preferred to BCNF?

6   Explain about concurrency controlled with optimistic method.

7 (a) How the terms fuzzy check pointing and recovery algorithm are used in advanced recovery technique?
  (b) What is immediate database modification and deferred database modification? Explain.

8   What is RAID? Discuss.

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Code: 9A05401

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
DATABASE MANAGEMENT SYSTEMS
(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a)   Define table. Explain linking relation tables with examples.
   (b)   What are the two main purposes of file system methods? Explain.

2 (a)   What is redundancy? What are the problems caused by the redundancy?
   (b)   Explain about the derived attributes and write its advantages and disadvantages.

3 (a)   What is an index? What are the components of an index?
   (b)   Discuss about any two relationships in relational database.

4 (a)   How to create a table structure? Explain.
   (b)   Create a table and write queries to display minimum and maximum elements in a selected column and row.

5 (a)   A Relation R ($\underline{A}$, B, C, D) has FD C ->B. is in 3NF? Justify your answer.
   (b)   A Relation R ($\underline{A}$, $\underline{B}$, C,) has FD's A -> AC, is R is in 3NF? Does AC -> C? Justify your answer.

6 (a)   Explain about inconsistent retrieval and scheduler in the concurrency controlled.
   (b)   Explain about the various level of lock granularity.

7 (a)   Explain about concept of the buffer management in details.
   (b)   What is recovery algorithm? Explain in details.

8   Describe the important means of file organization.

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Code: 9A05402

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
OBJECT ORIENTED PROGRAMMING
(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   Write short notes on:
   (a)   Overriding.
   (b)   Exceptions.

2 (a)   Explain garbage collection.
   (b)   What is method overloading? Explain with an example.

3 (a)   What is inheritance? Discuss the differences in inheritances in C++ and java?
   (b)   What is inheritance? Explain the member access mechanism in heritance with an example?

4 (a)   How to create sub package to a package?
   (b)   What is an API? Explain briefly.

5 (a)   Describe the ways in which a thread can be created.
   (b)   What is multitasking? Give an example.

6 (a)   Explain the label AWT control.
   (b)   Explain the button AWT control.

7 (a)   Explain various methods of applet class with necessary examples.
   (b)   What are containers? List various containers. Explain the usage of JPanel with example.

8   State whether type parameters can be instantiated using generics. Explain the reasons.

*****

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
OBJECT ORIENTED PROGRAMMING
(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   Distinguish the following terms:
  (a)   Inheritance and polymorphism.
  (b)   Dynamic binding and message passing.

2 (a)   What is an array? Why arrays are easier to use compare to a bunch of related variables?
  (b)   Write a java program to sort the list of integers.

3 (a)   Write the different forms of inheritances.
  (b)   Explain how you can define constants in java. Explain with example.

4   Write a program to create a private inner class that implements a public inter-face. Write a method that returns a reference to an instance of the private inner class, up-cast to the interface. Show that the inner class is completely hidden by trying to downcast to it.

5 (a)   What is a thread? Explain the concept of a multithreading programming.
  (b)   List the various methods defined by the thread class.

6 (a)   Describe any four mouse events.
  (b)   What is listener? With an example, describe the usage of event listener.

7 (a)   Explain the following methods of an applet: Init( ), Start( ), Stop( ), Paint( )
  (b)   Write an applet program that display simple message "ALL THE BEST'.

8   Write about single-member annotations, with a suitable example.

*****

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
OBJECT ORIENTED PROGRAMMING
(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) What is inheritance? Explain the concepts of reusability and extensibility with an example.
   (b) What is data abstraction? Compare data hiding and data encapsulation with an example.

2 (a) What is recursion? Write a java program to find factorial of given number.
   (b) What is a comment? Explain different types of comments available in java.

3 (a) Contrast: super Vs these keywords.
   (b) What is abstract class? Explain its importance. How is it designed in java?

4 (a) Explain about string tokenizer class.
   (b) Write a java program to find date and time.

5 (a) What is synchronization? Why is thread synchronization important for Multithreaded programs?
   (b) What is a monitor? Explain.

6 (a) What is the functionality supported by java related to fonts?
   (b) How using different fonts improves the user interface?

7 (a) Explain the use of JTable class with an example.
   (b) What are the mandatory attributes of applet tag? Explain them.

8   Explain different client TCP/IP socket constructors and usable methods in detail.

*****

4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
OBJECT ORIENTED PROGRAMMING
(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   Distinguish the following terms:
  (a)   Objects and classes.
  (b)   Data abstraction and data encapsulation.

2 (a)   Why java is important on internet? Explain.
   (b)   Write a java program using command line arguments. Explain.

3 (a)   Explain dynamic method dispatch with an example.
   (b)   List and explain the methods defined in the object class.

4   Create an interface with at least one method, in its own package. Create a class in
        a separate package. Add a protected inner class that implements the interface. In
        a third package, inherit from your class and, inside a method, return an object of
        the protected inner class, up-casting to the interface during the return.

5 (a)   Illustrate by program how try and catch can be put in a loop.
   (b)   Explain how a multiple catch statement works.

6 (a)   Explain any two layout managers with suitable examples.
   (b)   Write a java program to display the different car names using list object.

7 (a)   What is the use of JFrame? Create a JFrame containing a JDesktoppane, which
         has a single JInternal frame?
   (b)   Explain icons and Labels of swing?

8 (a)   Discuss about internet addressing in TCP/IP.
   (b)   What is the use of Inet address class?

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSS, IT and CSE)

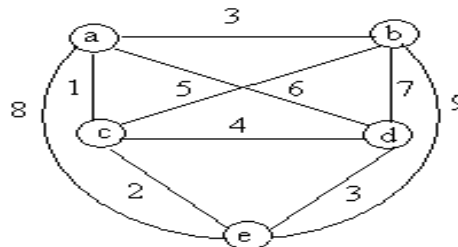Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Give brief description about performance measurement.
   (b) Write an algorithm to implement magic square.

2 (a) Define collapsing rule. Write the algorithm for COLLAPSING FIND by using COLLAPSING RULE.
   (b) Draw the different trees for the following sets $S_1 = \{1, 7, 8, 9\}$, $S_2 = \{2, 5, 10\}$, $S_3 = \{3, 4, 6\}$ with root nodes as 1, 5 and 3.

3 (a) Draw the tree calls of the function merge for the following set of elements:
           (5, 80, 30, 20, 50, 10, 70, 60, 40, 90).
   (b) Sort the above set of elements by using merge sort.

4   With the help of a suitable example, explain the greedy knapsack.

5   Find the shortest path b/w all pairs of nodes in the following graph.
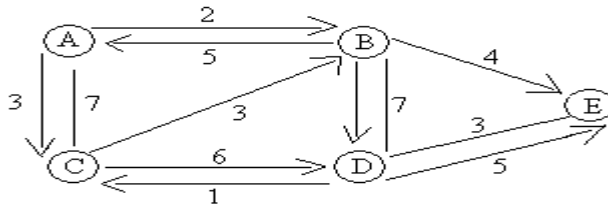
6 (a) Explain how the solution to the backtracking problems is represented. And how it is built.
   (b) Give the explicit and implicit constraints in 8-queens problem.

7   Solve the traveling sales man problem for the following graph by using branch and bound.

8   Explain about decision and optimization problems with an examples.
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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSS, IT and CSE)

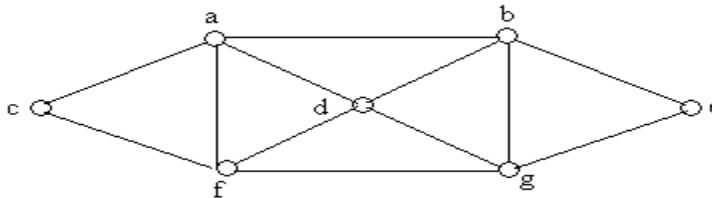Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a)   Explain the different areas of research where the algorithms can be applied.
  (b)   Explain how to identify the repeated elements.

2 (a)   Explain the scheme to construct bi-connected graph.
  (b)   What is articulation point? Explain with example.

3 (a)   Write an algorithm to sort N numbers in ascending order using merge sort.
  (b)   Compute the time complexity for merge sort.

4 (a)   Present a greedy algorithm for sequencing unit time jobs with deadlines and profits.
  (b)   Present an optimal randomized algorithm for minimum cost spanning trees.

5   Find the optimal sequence by using traveling sales person for the following given instance.

$$
\begin{array}{c}
\\
A \\
B \\
C \\
D
\end{array}
\begin{array}{c}
\begin{array}{cccc}
A & B & C & D
\end{array}\\
\begin{bmatrix}
\alpha & 12 & 5 & 7 \\
11 & \alpha & 13 & 6 \\
4 & 9 & \alpha & 18 \\
10 & 3 & 2 & \alpha
\end{bmatrix}
\end{array}
$$

6 (a)   Apply backtracking to the problem of finding a Hamiltonian circuit in following graph.

  (b)   Write the implementation of the above algorithm.

7 (a)   Write FIFOBB algorithm for the 0/1 knapsack problem.
  (b)   Explain the general method of branch and bound.

8 (a)   Prove that if $X \in NP$ y is NP-hard, then $X \leq_T^P Y$. In other words, NP-hard problems are at least as hard as any problems in NP.
  (b)   Prove that any two NP-complete problems are polynomially turning equivalent.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
DESIGN AND ANALYSIS OF ALGORITHMS
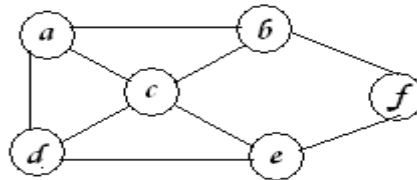(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a)   Write Miller-Rabin's primality testing algorithm.
   (b)   Discuss the different approaches to find the time complexity of algorithm.

2 (a)   Give the trees for the set {1, 2, 3, 4, 5, … n} by using weighting rule.
   (b)   Give an algorithm for implementation of union instruction using linked list and explain its
         implementation.

3 (a)   Derive the time complexity for strassen's matrix multiplication.
   (b)   How many additions, multiplications and subtractions are needed for a 2 x 2 matrix
         multiplication?

4 (a)   Write a detailed note on job sequencing with deadlines.
   (b)   Explain in detail about the optimal randomized algorithm for minimum cost spanning
         trees.

5 (a)   How would you construct an optimal binary search tree for a set of n keys if all the keys
         are equally likely to be searched for? What will be the average number of comparisons in
         the tree if $n = 2^k$?
   (b)   Write a pseudo code of the bottom-up dynamic programming algorithm for the knapsack
         problem.

6 (a)   Generate all permutations of {1, 2, 3, 4} by backtracking.
   (b)   Apply backtracking to solve the 3-coloring problem for the graph of.

7 (a)   Explain how the traveling salesperson problem is solved by using LC branch and bound.
   (b)   Write the general algorithm for branch and bound.

8   Give a dynamic programming solution for the subset sum problem. Analyze the
         asymptotic order of your solution. Explain why this solution does not put the subset sum
         problem in NP-hard.
*****

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSS, IT and CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Define an algorithm. Explain the different criteria that satisfy the algorithm.
  (b) Briefly explain about asymptotic notations.

2   Explain spanning trees and minimum cost spanning trees with suitable examples.

3 (a) What are the advantages of Strassens' matrix multiplication over normal one?
  (b) Present an algorithm for quick sort by using iterative method.

4 (a) Present a general method of greedy technique.
  (b) Explain the greedy knap sack with suitable example.
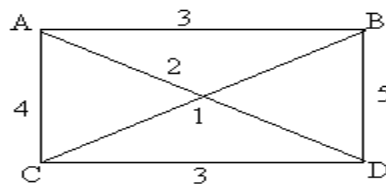
5 (a) Solve the following instance of the ALL PAIRS shortest path problem.
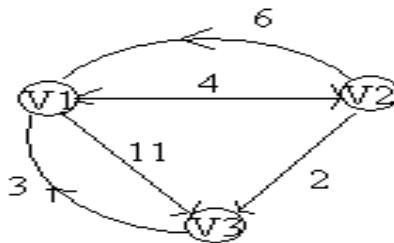
  (b) Discuss how to compute the cost of binary search tree.

6   Draw and explain the tree organization of the 4-queen solution space.

7   Solve the TSP problem for the following graph using branch and bound technique.

8   Consider the problem DNF-DISSAT which takes a Boolean formula S in disjunctive
       normal form (DNF) as input and asks if S is dissatisfiable that is variable of S so that
       if evaluates to 0. Show that DNF-DISSAT is Np- complete.
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Code: 9A05501

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
PRINCIPLES OF PROGRAMMING LANGUAGES
(Information Technology)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a)   Explain the characteristics that contribute to total cost of a programming.
  (b)   Explain some language design tradeoffs.

2 (a)   Explain axiomatic semantics for assignment statements and sequences.
  (b)   Distinguish between synthesized and inherited attributes.

3 (a)   Explain different implementation issues of character string types.
  (b)   What are design issues of enumeration data type?

4 (a)   Explain different forms of assignment statements with examples.
  (b)   What is mixed mode assignment? Explain with example.

5 (a)   Explain type-checking technique in parameter passing method.
  (b)   Discuss how generic functions are implemented in C++.

6 (a)   What is a task? What are different categories of tasks? Differentiate between task and subprogram.
  (b)   What is competition synchronization? Explain the need for competition synchronization.

7 (a)   What is meant by logic programming? Explain the uses of symbolic logic in formal logic.
  (b)   Explain exception handling in ML.

8 (a)   What are static scoped functional programming languages? Give brief description about them.
  (b)   Write a function to find the factorial of a given number using ML.

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Code: 9A05501

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
PRINCIPLES OF PROGRAMMING LANGUAGES
(Information Technology)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a)   With neat diagram explain different phases of a compiler.
   (b)   What are three fundamental features of object oriented programming language?

2   What are different types of notations available for expressing the syntax of a programming language? Explain in brief about each one with suitable examples.

3 (a)   Explain the concept of strong typing with examples.
   (b)   Explain the concept of type checking.

4   What is iterative statement? Explain the different types of iterative statements with examples.

5 (a)   What is operator overloading? Write a C++ Program for operator overloading?
   (b)   Explain generic functions in C++.

6 (a)   Explain Ada synchronous message passing model.
   (b)   What is a thread? Explain how threads are implemented in java.

7 (a)   What is event handling? What are the basic concepts of event handling?
   (b)   Explain about java event model.

8 (a)   Write short notes on separate compilation technique of python.
   (b)   Discuss with examples, the python procedure with a variable number of arguments.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
PRINCIPLES OF PROGRAMMING LANGUAGES
(Information Technology)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain the fundamental features of object oriented programming languages.
   (b) What do you mean by abstraction? Explain two different types of abstraction with examples.

2 (a) What is BNF notation? How is this useful in expressing the syntax of a programming language? Write any two constructs of C languages in BNF notation.
   (b) Define a token. Explain with an example.

3 (a) Explain the concept of binding and binding time with example.
   (b) What is aliasing? What are its disadvantages?

4 (a) Explain logically controlled loops and their design issues.
   (b) What are design issues of counter controlled loops? Explain for statement of C based languages.

5 (a) Distinguish between pass-by-result and pass-by-value-result.
   (b) Explain in detail two ways of mapping actual parameters to corresponding formal parameters.

6 (a) Explain C# threading operations with examples.
   (b) What are advantages of monitors over semaphores?

7 (a) In what way C++ throw specification differs from throw clause in java?
   (b) Explain the basic concepts of exception handling.

8 (a) Discuss in detail about the different data structures that are present in LISP with suitable examples.
   (b) Explain with an example, the where clause using Haskell.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
PRINCIPLES OF PROGRAMMING LANGUAGES
(Information Technology)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a)   Explain in detail various phases in the process of compilation.
   (b)   What are the fundamental features of object oriented programming?

2 (a)   Define CFG. State whether CFG is a language generator or recognizer.
   (b)   What is a parse tree? Explain with an example.
   (c)   What is an assertion? Explain with an example.

3 (a)   Explain dynamic scope of variable with example.
   (b)   Explain static scope of variables with example.

4 (a)   What is short circuit evaluation? Explain.
   (b)   What do you mean by scope and lifetime of a variable? Explain with examples.

5   Explain in detail different parameters passing methods?

6 (a)   What are parameterized abstract data type? Explain with examples in C++.
   (b)   What are the three possible levels of concurrency in programs?

7 (a)   Explain the negation problem in prolog.
   (b)   Explain about the basic elements of prolog.

8 (a)   Discuss in detail about the lists and list operations with respect to Meta language.
   (b)   Define inheritance. Explain multiple inheritance technique using python language.

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Code: 9ABS401/9ABS304

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
PROBABILITY & STATISTICS
(Common to CE, ME, CSS and IT)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   Two dice are thrown. Find the probability that the sum of the numbers coming upon them is 9. If it is known that the number 5 always occurs on the first die.

2   A random variable x has the density function $F(x) = \begin{cases} 1/4, & -2 < x < 2 \\ 0, & d \text{ else where} \end{cases}$

3   Two dice are thrown X assign to each point if S the sum of the variables on the faces. Find the mean and variance of the random variable.

4 (a) The mean of certain normal population is equal to the standard error of the mean of the samples of 64 from that distribution. Find the probability that the mean of the sample size 36 will be negative?

   (b) The probability that the sample mean will not differ from the true mean by more than 15% of the standard deviation is 0.95. How large the sample should be?

5 (a) Prove that for a random sample of size n, $x_1, x_2, \ldots, x_n$ taken from a finite population

        $S^2 = 1/n \sum_{i=1}^{n} (x_i - \bar{x})^2$ is not unbiased estimator of the parameter σ^2 but 1/n-1

        $\sum_{i=1}^{n} (x_i - \bar{x})^2$ is unbiased.

   (b) Assuming that $\sigma = 20$, how large a random sample be taken to assert with probability 0.95 that the sample mean will not differ from the true mean by more than 3.0 points.

6 (a) In a random sample of 400 persons from a large population, 120 are females. Can it be said that males and females are in the ratio 5:3 in the population? Use 1% level of significance.

(b) An investigation of the merits of two kinds of flash light batteries showed that a random sample of 100 batteries of brand A tested on average 36.5 hrs with a S.D. of 1.8 hrs. While a random sample of 80 batteries of brand B tested on the average 36.8 hrs with a S.D. of 1.5 hrs. Test whether the observed difference between the average life times is significant or not? Use 0.05 level of significance.

7 1000 students at a college level were graded according to their I.Q and the economic conditions of their home. Use χ^2 test to find out whether there is any association between condition at home with $\alpha = 0.05$ and I.Q.

Economic condition	High	Low	Total
Rich	460	140	600
Poor	240	160	400
Total	700	300	1000

8 Cars arrive at a petrol pump with exponential inter arrival time having mean 1/2 min. The attendant takes an average of 1/5 min per car to supply petrol, the service time being exponentially distributed. Determine:
(i) The average number of cars waiting to be served
(ii) The average number of cars in the system and
(iii) The proportion of time for which the pump attendant is idle.

*****

Code: 9ABS401/9ABS304

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
PROBABILITY & STATISTICS
(Common to CE, ME, CSS and IT)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) If A and B are independent events. Then prove A^c and B^c are also independent events.
   (b) If A and B are independent events. Then prove A and B^c are also independent.

2   If X is a continuous random variable and Y = ax+b prove that E(1/y) = aE(x) + b and V(y) = a^2 V(x).

3   Find the mean and the variance of the uniform probability distribution given by:

$$f(x) = \frac{1}{n} \ for \ x = 1, 2, ... n$$

4 (a) Find the maximum difference that we can expect with probability 0.95 between the means of sizes 10 and 12 from a normal population if their standard deviations are found to be 2 and 3 respectively.
   (b) If two independent random samples of sizes n_1 = 9 and n_2 = 16 are taken from a normal population. What is the probability that the variance of the first sample will be at least 4 times as large as the variance of the second sample?

5 (a) Write a short note on interval estimation and Bayesian estimation.
   (b) Measurements of the weights of a random sample of 200 ball bearing made by a certain machine during one week showed a mean of 0.824 and a S.D of 0.042. Find maximum error at 95% confidence interval. Find the confidence limits for the mean if x = 32.

6 (a) In a sample of 600 students of a certain college 400 are found to use ball pens. In another college from a sample of 900 students 450 were found to use ball pens. Test whether 2 colleges are significantly different with respect to the habit of using ball pens.

   (b) The mean consumption of food grains among 400 sampled middle class consumers is 380 gms per day per person with a S.D. of 120 gms. A similar sample survey of 600 working class consumers gave a mean of 410 gms with a S.D. of 80 gms. Are we justified in saying that the two classes consume the same quality of food grains? Use 5% level of significance

7 (a) In a random sample of 1000 persons from town A, 400 are found to be consumers of wheat. In a sample of 800 from town B are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B, so far as the proportion of wheat consumers is concerned?

   (b) 5 measurements of the output of the following results. (in kgs of materials per one hour of operation) Assuming that both samples have obtained from normal populations, test at 0.01 level of significance if two populations have the same variance.

| Unit A | 14.1 | 10.1 | 14.7 | 13.7 | 14.0 |
| Unit B | 14.0 | 14.5 | 13.7 | 12.7 | 14.1 |

8   Consider a single server queuing system with Poisson input and exponential service time. Suppose the mean arrival rate is 3 calling units per hrs with the expected service time as 0.25 hrs and the maximum permissible number of calling units in the system is two. Obtain the steady state probability of the number of calling units in the system and then calculate the expected number in the system.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
PROBABILITY & STATISTICS
(Common to CE, ME, CSS and IT)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a)   If $A \subseteq B$ then prove that $(i)\, P(A^c \cap B) = P(B) - P(A)$ (ii) $P(A) \leq P(B)$

(b)   If A and B are mutually exclusive events, then prove that $P(A) \leq P(B^c)$.

2   A random variable x has the density function: $f(x) = K . \dfrac{1}{1+x^2}, \; if -\infty < x < \infty = 0,$

otherwise determine K and the distributive function.

3   In a distribution exactly normal 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution?

4   A random sample of size is taken from a normal population with $\mu = 51.4\, and\, \sigma = 6.8$. What is the probability that the mean of the sample will

(a)   Exceed 52.9
(b)   Fall between 50.5 and 52.3
(c)   Be less than 50.6.

5 (a)   Give the difference between the interval estimation and the Bayesian estimation.
(b)   The mean weight loss of n = 16 grinding balls after a certain length of time in mill slurry is 3.42 grams with a S.D 0.68 grams. Find the maximum error of estimate at 99% confidence interval. Also construct a 99% confidence interval for the true mean weight loss of such grinding balls under the stated conditions.

6 (a) Experience had shown that 20% of a manufactured product is of top quality. In one day's product of 400 articles only 50 are of top quality. Test the hypothesis at 0.05 levels?

(b) A sample of 900 members has a mean of 3.4 cm and S.D. 2.61 cm is the sample from a large population of mean 3.25 cm and S.D. 2.61 cm. If the population is normal and its mean is unknown find the 95% fiducial limits of true mean?

7 (a) A sample poll of 300 voters from district A and 200 voters from district B showed that 56% and 48% respectively, were in favour of a given candidate. At a 0.05 level of significance, test the hypothesis that the there is a difference in the districts?

(b) Two independent samples of 8 and 7 items respectively had the following values of the variables.

| Sample I | 9 | 11 | 13 | 11 | 16 | 10 | 12 | 14 |
| Sample II | 11 | 13 | 11 | 14 | 10 | 8 | 10 | - |

Do the estimates of the population variance differ significantly?

8 A bank plans to open a single server drive-in banking facility at a certain center. It is estimated that 20 customers will arrive each hour on average. If on average, it requires 2 min to process a customer's transaction, determine

(i) The proportion of time that the system will be idle;

(ii) On the average, how long a customer will have to wait before reaching the server;

(iii) The fraction of customers will have to wait?

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013
PROBABILITY & STATISTICS
(Common to CE, ME, CSS and IT)

Time: 3 hours
Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 An integer is chosen at random from the first 200 positive integers. What is the probability that the integer chosen is divisible by 6 or 8?

2 The cumulative distribution function for a continuous random variable x

$$F(x)=\begin{cases} 1-e^{-2x} & x \geq 0 \\ 0 & x < 0 \end{cases}.$$ Find the density function f(x).

3 If mean = 70, standard deviation is 16. Find
   (a) $P(38 \leq x \leq 46)$
   (b) $(82 \leq x \leq 94)$
   (c) $(62 \leq x \leq 86)$

4 When we take a sample from an infinite population what happen to the standard error of the mean if the sample size is (i) Increased from 50 to 200 (ii) Decreased from 225 to 25.

5 The mean mark in mathematics in common entrance test will vary from year to year. If this variation of the mean mark is expressed subjectively by a normal distribution with mean $\mu_0 = 72$ and variance $\sigma_0^2 = 5.76$.
   (i) What probability can we assign to the actual mean being somewhere between 71.8 and 73.4 for the next year's test?
   (ii) Construct a 95% Bayesian interval for μ if the test is conducted for a random sample of 100 students from the next incoming class yielding a mean mark of 70 with S.D. of 8.
   (iii) What posterior probability should be assigned to the event of part (i)?

6 (a) A company claims that its light bulbs are superior to those of its main competitor. If a study showed that a sample of $n_1 = 40$ of its bulbs that a mean life time of 647 hrs of continuous use with a S.D. of 27 hrs; while a sample of $n_2 = 40$ bulbs made by its main competitor had a mean life time of 638 hrs of continuous use with a S.D. of 31 hrs. Does this substantiate the claim at 0.05 level of significance?

(b) In a study designed to investigate whether certain detonators used with explosives in coal mining meet the requirement that at least 90% will ignite the explosive when charged, it is found that 174 of 200 detonators function property. Test the null hypothesis $p = 0.9$ against the alternative hypothesis $p > 0.9$ at 0.05 level of significance.

7 Scores obtained in a shooting competition by 10 soldiers before and after intensive training are given below:

Before	67	24	57	55	63	54	56	68	33	43
After	70	38	58	58	56	67	68	75	42	38

Test whether the intensive training is useful at 0.05 level of significance.

8 (a) What is the probability distribution of time spent in the (M/M/1) : (∞/FIFO) Queuing system?

(b) What is the probability distribution density function of the waiting time distribution for (M/M/1) : (∞/FIFO) Queuing system?

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ENVIRONMENTAL SCIENCE
(Common to CE, ME, IT, CSE, AE, BT and MCT)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Define environment and environmental science.
  (b) Explain the scope of environmental science in our daily life.

2   Write a short notes on:
  (a) Hydrological cycle.
  (b) Droughts.
  (c) Soil erosion.
  (d) Bio gas.

3   What are ecological pyramids? Write about various types of ecological pyramids with examples.

4   What do you mean by consumptive use value, productive use value, social value, ethical value, aesthetic value and option value of biodiversity?

5 (a) Define pollution and various types of pollution.
  (b) Explain about the source, effects of water pollution.

6   Population, consumerism and waste production are interrelated. Explain.

7   What is the importance of environmental education? What is value based education?

8 (a) What are the environmental parameters to be taken into consideration when visiting an industry?
  (b) Write about the structural and functional components of an ecosystem.

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Code: 9ABS402/9ABS303

2

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ENVIRONMENTAL SCIENCE
(Common to CE, ME, IT, CSE, AE, BT and MCT)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   How would environmental awareness help to protect our environment?

2 (a)   What are renewable and non-renewable sources? With examples.
   (b)   Explain in brief various renewable resources in native.

3   Explain the functional attributes of ecosystem.

4   Write a short notes on:
   (a)   Ex situ conservation.
   (b)   Hot spots.
   (c)   Poaching.
   (d)   Endemic species.

5   Explain and write notes on solid waste management.

6   What are the measures to be taken for conservation of water resources?

7   Writes notes about:
   (a)   GIS.
   (b)   Population characteristics.
   (c)   Human immune deficiency syndrome.

8   Explain the salient features of forest Eco-system.

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3

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ENVIRONMENTAL SCIENCE
(Common to CE, ME, IT, CSE, AE, BT and MCT)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Define:
    (i) Concept of Eco-mark.
    (ii) Green marketing.
  (b) Write notes on people's contribution and awareness towards environmental protection.

2   Explain the ecological and commercial uses of forests. Discuss major causes consequences of deforestation.

3   Write about:
  (a) Grazing food chain.
  (b) Oxygen cycle.
  (c) Primary production of an ecosystem.
  (d) Ecological succession.
  (e) Homeo stasis.

4   Explain the Bio-geographical classification of India.

5   Write about soil pollution and explain the impacts of modern agriculture on soil.

6   Write short notes on:
  (a) Rain water harvesting.
  (b) Acid rain.
  (c) Green house gases.

7   Explain the role of information technology in environment.

8 (a) Which water quality parameters are to be taken into consideration while assessing a drinking water sample testing in a laboratory?
  (b) Write BIS: 10500: 1991 drinking water quality parameter charts.

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4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ENVIRONMENTAL SCIENCE
(Common to CE, ME, IT, CSE, AE, BT and MCT)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   Define natural resources. Explain about the mineral resources, uses of minerals, environmental impacts of mineral mining.

2   What are Bio-geochemical cycles? Explain in brief about:
       (i)   Nitrogen cycle.
       (ii) Carbon cycle with neat diagrams.

3 (a) Explain the types of conservation techniques taken for biodiversity.
  (b) Major threats to biodiversity.

4   Explain the multidisciplinary nature of environmental studies with flow chart.

5   Write briefly:
   (a) Minimata disease.
   (b) Bio chemical oxygen demand.
   (c) Chernobyl nuclear disaster.
   (d) Landslides.

6   Discuss various issues and measures for women and child welfare at international and national level.

7   Explain the following:
   (a) Environmental protection act, 1986.
   (b) Wild life protection act 1972.

8   Write about different types, characteristics and components of aquatic eco-system.

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