

HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR

Final B. Tech. (CSE / IT)

End Semester Examination

Odd Semester (VII), 2022-23

ECS-491: Software Testing

Max. Marks: 50

Time: 2:30 Hours

Note: Attempt all questions. All questions carry marks, as shown against them.

Course Outcomes (CO):

- Understand basic concepts of software testing and defect tracking. (Understand)
- Understand and apply various white box and black box testing and system testing techniques. (Understand, apply)
- Design and development of optimal test suit for various testing techniques. (Understand, apply)
- Design and implementation of test automation framework. (Understand, Apply)
- Analyze the structure of testing tools for conventional and object-oriented testing tools. (Analyze)

		Related CO	Marks
Q. No. 1	Attempt ALL subparts of this question. (a) Define testing objective and principles of testing. What are various types of testing?	CO1	5
	(b) Define various types of test metrics. Elaborate software quality in detail.	CO1	5
Q. No. 2	Attempt ALL subparts of this question. (a) How can you compute the cyclomatic complexity of a program? How is cyclomatic complexity useful in program testing?	CO2	5
	(b) Design the black-box test suite for a function that takes the name of a book as input and searches a file containing the names of the books available in the Library and displays the details of the book if the book is available in the library otherwise displays the message "book not available".	CO2	5
Q. No. 3	Attempt ALL subparts of this question. (a) Explain the following terms: i. Defect bash ii. Stress Testing iii. Beta testing iv. Reliability Testing v. Scalability Testing	CO2, CO3	5

	(b) What do you understand by the term integration testing? Which types of defects are uncovered during integration testing? What are the different types of integration testing methods that can be used to carry out integration testing of a large software product?	CO3	5
Q. No. 4	Attempt ALL subparts of this question.		
(a)	What do you understand by regression testing? When it is carried out? Why regression testing is necessary? How are regression test cases designed? How is regression testing performed?	CO4	5
(b)	Suppose in order to estimate the number of latent errors in a program, you seed it with hundred defects of different kinds. After testing the software using its full test set, you discover only eighty of the introduced defects. You discover fifteen other defects also. Estimate the number of latent errors in the software. What are the limitations of the defect seeding method?	CO4	5
Q. No. 5	Attempt ALL subparts of this question.		
(a)	What are the different levels of testing object-oriented programs? What is a suitable unit for testing object-oriented programs?	CO5	5
(b)	Discuss test automation. What are criteria for tool selection? What are various types of frameworks for test automation? Write names of few automation tools.	CO5	5

Date of showing evaluated answer books:

No. of Printed Pages: 02.

Roll No. 190104041.....

HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR
B. Tech. (CSE / IT)
End Semester Examination
Odd Semester (VII), 2022-23
ECS-453: Artificial Intelligence

Time: 2:30 Hours

Max. Marks: 50

Note: 1. Attempt all questions. All questions carry marks, as shown against them.
2. Q.No.6 is from the lab component of the subject.

Course Outcomes (CO):

1. Understand different types of AI agents (Understand).
2. Understand and apply various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms) (Understand, Apply).
3. Understand the fundamentals of knowledge representation, reasoning, and machine learning techniques and apply them to real world problems. (Understand, Apply)
4. Know how to build simple knowledge-based systems using languages like LISP, Prolog, and AI tools like JESS. (Apply)
5. Carry out independent (or in a small group) research and communicate it effectively in a seminar. (Apply, Analyze)

		Related CO	Marks
Q. No. 1	Attempt ALL subparts of this question.		
(a)	What is "Artificial Intelligence and Artificial Intelligence Technique"? Briefly explain how AI Technique can be represented and list out some of the task domain of AI.	CO1	4
(b)	What are properties of good system for representation of knowledge? Explain different approaches for knowledge representation. Compare knowledge and meta-knowledge.	CO1	4
Q. No. 2	Attempt ALL subparts of this question.		
(a)	Discuss the heuristic function. Explain how the heuristic function helps during search procedure. Explain with a suitable example. Compare Informed & Uninformed search with examples.	CO2	4
(b)	What is production system? Explain it with an example. Discuss the Characteristics of a production system.	CO2	4
Q. No. 3	Attempt ALL subparts of this question.		
(a)	State the resolution principle. Discuss various types of resolution used in AI techniques. Use resolution refutation on a set of clauses to prove that there is a green object if we are given: <ul style="list-style-type: none">• If pushable objects are blue, then nonpushable ones are green.• All objects are either blue or green but not both.• If there is a nonpushable object, then all pushable ones are blue.• Object Obj1 is pushable.	CO3	4

	<ul style="list-style-type: none"> • Object Obj2 is not pushable. <p>(i) Convert these statements to expressions in first order predicate calculus,</p> <p>(ii) Convert the preceding predicate calculus expressions to clause form.</p> <p>(iii) Combine the preceding clause form expressions with the clause form of the negation of the statement to be proved, and then show the steps used in obtaining a resolution refutation.</p>		
(b)	Explain the difference between Associative network and semantic network with examples and also discuss inference system in details.	CO3	4
Q. No. 4	Attempt ALL subparts of this question.		
(a)	What do you understand by Natural Language Processing? List any two real-life applications of Natural Language Processing. Discuss various approaches of NLP in detail.	CO4	4
(b)	What is speech recognition? How a speech recognition engine works? Explain various AI based Speech recognition techniques.	CO4	
Q. No. 5	Attempt ALL subparts of this question.		
(a)	Explain the role of knowledge engineer, domain expert and an end user in an expert system and discuss a detailed architecture of expert system.	CO5	4
(b)	<p>Write the explanations of any TWO of the following terms:</p> <p>(i) DENDRAL</p> <p>(ii) MYCIN</p> <p>(iii) Knowledge acquisition system</p> <p>(iv) PROLOG</p>	CO5	4
Q. No. 6	(Laboratory Component): Attempt ALL subparts of this question		
(a)	<p>Write a Lisp program to implement the steepest ascent Hill Climbing.</p> <p>Or</p> <p>Write a LISP function called "match" that takes two arguments and returns T if the two are identical, returns the two arguments if one is a variable and the other a term and returns nil, otherwise.</p>	CO2, CO5	5
(b)	<p>Write a PROLOG program that answers questions about family members and relationships. Include predicates and rules which define sister, brother, father, mother, grandchild, grandfather and uncle. The program should be able to answer queries such as following:</p> <p>?- father (X, bob). ? - grandson(X,Y). ? - uncle(bill,sue). ? - mother(mary,X).</p>	CO2, CO5	5

HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR**End Semester Examination**(B.Tech 7th Sem CSE/IT)**ODD Semester (VII), 2022-23****EIT-463: DATA WAREHOUSING & DATA MINING****Time: 2.30 Hrs****Max. Marks: 50****Note: 1. Attempt all questions.****2. All questions carry equal marks, as shown against them.****Course Outcomes :**

- | | Related
Course
Outcome | Marks |
|---|------------------------------|-------|
| 1. Understand importance of abstraction of Knowledge from unstructured sources at sufficient level. | CO1 | 10 |
| 2. Use of high level operational skills and real world case studies for knowledge discovery and data warehousing based principles. | CO2 | 10 |
| 3. Understand the areas of probability, statistics and machine learning algorithms which underpin the knowledge discovery enterprise. | CO3 | 10 |
| 4. Design data mining and data warehousing systems and solutions to meet user requirements and specifications. | CO4 | 10 |
| 5. Compare and contrast OLAP and data mining as techniques for extracting knowledge from a data warehouse. | CO5 | 10 |

Q.No. 1: Attempt all questions. 10

- (a) What is data-mining? How data mining system can be integrated with database and Data-warehouse system. CO1 (05)
- (b) Explain the various data-reduction techniques used in the preprocessing of data-mining? CO1 (05)

Q.No.2: Attempt all questions. 10

- (a) What are the drawbacks of Apriori Algorithm? How can we overcome from these drawbacks? CO2 (05)
- (b) Explain Association Rule Mining. What are the various algorithms for generating association rules? CO2 (05)

Q.No. 3: Attempt all questions. 10

- (a) What are the goals of clustering? Describe the partitioning methods of clustering in detail. CO3 (05)
- (b) Describe the data classification process with diagram. How does the Naive Bayesian classification works? CO3 (05)

Q.No. 4: Attempt all questions. 10

- (a) What is multidimensional data model? Discuss the schemas for multidimensional data. CO4 (05)
- (b) Define data-mart? How it is important in data-warehouse? CO4 (05)

Q.No. 5: Attempt all questions. 10

- (a) Differentiate between Tuning data-warehouse and Testing data-warehouse? CO5 (05)
- (b) Explain the following terms:
I. OLAP Server (II) HOLAP CO5 (05)

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HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR

B. Tech. (CSE / IT)

End Semester Examination

Odd Semester (VII), 2022-23

ECS-451: Mobile Application Development

Time: 2:30 Hours

Max. Marks: 50

Note: 1. Attempt all questions. All questions carry marks, as shown against them.

Course Outcomes (CO):

1. Understanding technology and business trends impacting mobile applications.(Understand)
2. Understand and implement mobile application development languages .(Understand,Apply)
3. Understand the characterization and architecture of mobile applications.(Understand)
4. Understand and design enterprise scale requirements of mobile applications. (Understand, Apply,Analyze)
5. Design and develop mobile application using application development framework .(Apply, Analyze)

		Related CO	Marks
Q. No. 1	Attempt ALL subparts of this question. (a) Discuss important factors to be kept in mind during the development of mobile applications. Discuss the role of UI in mobile applications.	CO1	5
	(b) Explain android architecture in details with neat diagram. List Android App components.	CO1	5
Q. No. 2	Attempt ALL subparts of this question. (a) Explain the Android App build process. OR Discuss the prominent features of Android Studio as a tool for app development that have made it popular.	CO2	5
	(b) Differentiate between C++ and Java with their strengths and weaknesses with reference to mobile application development.	CO2	5
Q. No. 3	Attempt ALL subparts of this question. (a) What do you mean by mobile operating system? Describe any five mobile OS with their features.	CO3	5
	(b) Explain various options available for storing and managing data of mobile applications persistently. OR	CO3	5

	Explain Android component model in detail?		
Q. No. 4	Attempt ALL subparts of this question.		
(a)	Explain how the security threats are addressed in the enterprise solutions. Illustrate with suitable examples.	CO4	5
(b)	Differentiate between functional and non functional requirements for any mobile app? Discuss functional requirement of a mobile application for fisherman?	CO4	5
Q. No. 5	Attempt ALL subparts of this question.		
(a)	Define mobile application testing and it's various types in detail?	CO5	5
(b)	Explain the process of mobile application testing also explain it's various tools?	CO5	5

HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR

End Semester Examination

Odd Semester (B. Tech, 7th semester), 2022-23

OCE 491: Environmental Pollution and Management

Time: 2:30 Hour

Max. Marks: 50

Note: 1. Attempt all questions. All questions carry marks as shown against them

CO1: To understand the impact of man on environment in terms of population and pollution.

CO2: To understand the sources, classification, processes and remedial measures of water pollution.

CO3: To understand the air, land and noise pollution.

CO4: To understand the techniques involved in Environmental Impact Assessment and Environmental Audit of various projects

CO5: To understand various contemporary issues and environmental legislations pertaining to environmental pollution

Q.1

a) Royal Bengal Tiger populations in two national parks are limited by two different factors. There is no logging activity in either of the national parks. In one, the population is limited by the size of the park and in the other it is limited by the prey availability. If both the population reach the carrying capacity, in which National Park the tiger population is likely to show higher annual variability and why? 10

b) Though India's birthrate is much lower than many of the sub Saharan countries, its CO1 repercussions are more serious in India." Discuss this statement with reference to India's population demography 2

c) Strategic framework for Climate Change in India as adopted under the NAPCC. Also, discuss India's stand at the recently concluded CoP-27 held in Egypt. 4

d) Distinguish clearly between El Nino and La Nino. 2

Q.2

a) Draw the typical graphical solution of the Streeter-Phelps equation. Assuming the 15 km long Kanpur stretch of river Ganges to have three equidistant drains, with critical DO levels of 3 mg/l in each, draw the DO sag curve. The saturation DO may be considered as 8 mg/l. 3

b) Explain the significance of nitrate and fluoride contamination in drinking water supplies. 2

c) Write a short note on water-borne diseases. 2

d) Answer the following based on the hydro-geometrical data of two polluted rivers R1 and R2 given below: 3

(i) Which river has the higher photosynthetic activity and why?

(ii) Which river has the higher waste assimilative capacity and why?

CO2

10

2

4

2

10

3

2

2

3

River	Depth (m)	Width (m)	Velocity (m/sec)	Discharge
R1	1.5 m	15	0.45	10.125
R2	2.0 m	17	0.30	10.125

Q.3	a) How much would be the % HbCO in the blood when a person is doing some physical activity ($\alpha = 2$) in an exposed environment of CO having a concentration of 100 ppm? Assume exposure time is 1 hour.	3
b)	Define Land Pollution. Enumerate and explain some of the major effects of land pollution	2
c)	Enumerate the different methods of disposal of MSW. In this context, briefly explain the ' <i>area method</i> ' technique used in sanitary landfilling	3
d)	Explain the associated health effects of noise pollution.	2
Q.4		CO3
a)	Explain the limitations of the EIA process.	2
b)	With a neat sketch, explain the role of EIA in sustainable development	3
c)	Discuss the major benefits associated with the conduct of an Environmental Audit	3
d)	Discuss the role of ISO 14000 in Environmental management System	2
Q.5		CO4
a)	Explain the concept of ' <i>International Resource Sharing</i> ' using some real-life examples	3
b)	Define the term ' <i>Emissions Trading</i> '. In this context explain 'cap trading' including their advantages and disadvantages.	3
c)	Explain the salient features of Biodiversity Act	2
d)	Enumerate the main aims and objectives of the Water Act.	2
		CO5