University of Mumbai

Examination 2020 under cluster 7 (Lead College: SSJCOE)

Examinations Commencing from 15th June 2021 to 24th June 2021

Program: **Information Technology**

Curriculum Scheme: Rev2019

Examination: SE Semester III

Course Code: ITC305 and Course Name: Paradigms and Computer Programming Fundamentals

Time: 2 hour Max. Marks: 80

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following is **NOT** a correct syntax for a type signature of a Haskell function ?
Option A:	sort :: [a] -> [a]
Option B:	sort :: Ord [a] -> Ord [a]
Option C:	sort :: (Num a, Ord a) => [a] -> [a]
Option D:	sort :: Ord a => [a] -> [a]
2.	Following Image 1 shows predicates defined in two distinct prolog files KB1 and KB2 Which of the following statements is true about the above two KBs KB-1: edge(a,b). edge(b,c). path(X, X). path(X, Y) :- edge(Z, Y), path(X, Z). KB-2: edge(a,b). edge(b,c). path(X, Y) :- path(X, Z),edge(Z, Y). path(X, X). Image 1
Option A:	Query path(a,a) will evaluate as true in both KBs
Option B:	Query path(a,a) will evaluate as false in both KBs
Option C:	Query path(a,a) will evaluate as true in KB-1 and false in KB-2
Option D:	Query path(a,a) will evaluate as true in KB-1 and will not terminate in KB-2
3.	_____ is the process of associating names to a much complicated programming fragment, so that it (the programming fragment) can be thought in terms of its functionality or purpose rather than how actually the functionality is carried out.

Option A:	Recursion
Option B:	Abstraction
Option C:	Repetition
Option D:	Inclusion
4.	Wrapping data and it's functionality into a single entity is known as _____.
Option A:	Abstraction
Option B:	Encapsulation
Option C:	Polymorphism
Option D:	Modularity
5.	Following Image 2 shows a knowledge base. Which of the following is correct re-declaration of predicate "**classmate**" that will never result in attributing a student to be his/her own classmate. e.g. we do not want the query **"classmates(sujay, sujay)"** to evaluate as **true**. takes(sujay, ME201). takes(sujay, ITC305). takes(abhay, ME302). takes(abhay, ITC305). classmates(X, Y) :- takes(X, Z), takes(Y, Z). Image 2
Option A:	No change in 'classmates' predicate declaration is required.
Option B:	This can't be achieved by only changing the predicate 'classmates'.
Option C:	New declaration of 'classmates' will be: classmates(X, Y) :- takes(X, Z), takes(Y, Z), X \= Y.
Option D:	New declaration of 'classmates' will be: classmates(X, Y) :- X \= Y, takes(X, Z), takes(Y, Z).
6.	A concurrent system is _____ when more than one task can be physically active at simultaneously, but does not require more than one processor to be physically separated.
Option A:	Parallel
Option B:	Sequential
Option C:	Natural

Option D:	Consecutive
7.	Translation of high-level language to assembly or machine language is the job of a system program known as a _____.
Option A:	compiler
Option B:	converter
Option C:	processor
Option D:	composer
8.	Synchronization is ____ in the message-passing model in order to synchronize more than one process.
Option A:	explicit
Option B:	implicit
Option C:	not guaranteed
Option D:	not possible
9.	Which of the following statements is FALSE about scripting languages?
Option A:	Scripting languages don't generally require the declaration of types for variables.
Option B:	Most scripting languages perform extensive run-time checks to make sure that values are never used in inappropriate ways
Option C:	Some scripting languages even store numbers as strings, so calculations may not always be what you expect, although most auto-converting if needed.
Option D:	Scripting languages do not handle the type errors and require the programmer to check for these errors if they require to.
10.	The Haskell the Type class concept is an example of _____ and type variables concept is an example of _____ .
Option A:	parametric polymorphism, ad hoc polymorphism
Option B:	binding, scoping
Option C:	aliasing, polymorphism
Option D:	classes, types
11.	Data types like Arrays, Object and Records are referred to as
Option A:	Context types
Option B:	Composite Types

Option C:	Numeric types
Option D:	User defined Types
12.	Functional Programming finds its roots in _____.
Option A:	Turing Theory
Option B:	Lambda Calculus
Option C:	Post Hypothesis
Option D:	Kleene Theory
13.	When object is strictly defined with its type and if it enforces strong typing at compile time then language is known as_____
Option A:	Statically typed language
Option B:	Dynamically typed language
Option C:	Poorly typed language
Option D:	Run time language
14.	Why would a class be declared as abstract?
Option A:	So that it can serve as a template for derived classes.
Option B:	The class has no independent state and behaviour and can't be instantiated.
Option C:	So that it cannot be inherited from.
Option D:	Because it has no abstract methods.
15.	Which is **NOT** one of the rules that define the unification process in logical languages.
Option A:	A constant unifies only with itself.
Option B:	Two structures unify if and only if they have the same predicate name and the same arity, and the corresponding arguments unify recursively.
Option C:	A variable unifies with anything. If the other thing has a value, then the variable is instantiated. If the other thing is an uninstantiated variable, then the two variables are associated in such a way that if either is given a value later, that value will be shared by both.
Option D:	It is sufficient to consider that two structures unify each other when they have the same predicate name and the same arity.
16.	Which is the most suitable paradigm to choose to implement the following case: "In a large warehouse, autonomous robots need to transport and place pallets of inventory from one a select location to another" ?
Option A:	Fractional

Option B:	Logical
Option C:	Scripting
Option D:	Concurrent
17.	A shell script is a _____.
Option A:	sequence of commands
Option B:	sequence of functions
Option C:	sequence of patterns
Option D:	sequence of data records
18.	Which of the statements is **TRUE** in a protected inheritance in c++?
Option A:	Private members of the base class become protected members of the derived class
Option B:	Protected members of the base class become public members of the derived class
Option C:	Public members of the base class become protected members of the derived class
Option D:	Protected derivation does not affect private and protected members of the derived class
19.	Which is **NOT** a Type Class in Haskell.
Option A:	Show
Option B:	Read
Option C:	Bounded
Option D:	Binding
20.	ArithmeticException is thrown in which of the following cases of executions?
Option A:	Divide by zero
Option B:	Divide by one
Option C:	Divide by float
Option D:	Divide by double

Q2.	**Solve any Four out of Six** **5 marks each**
A	List and explain different problem domains where we can make use of scripting languages.
B	Which are important factors to be considered, while making a choice of a programming language ?
C	What is pattern matching? How does scripting languages utilise the power of pattern matching?

D	What is Polymorphism? Explain different programming constructs that make use of the concept of polymorphism in any object oriented programming language.
E	What is currying? Define a haskell function "**add3**" that adds 3 inputs provided to it. Define a curried version of this function named "**sumplus1000"** that adds 1000 to its two inputs.
F	Explain synchronization. How can it be implemented by spinning and blocking?
Q3.	**Solve any Four out of Six** **5 marks each**
A	Which principles of storage allocation mechanism used to manage an object's space?
B	Discuss six principal options used to create thread of control in concurrent programs.
C	Define a haskell function named "addUs" that adds 2 input numbers. Using this function as a building block, define a Haskell function "multiplyUs" that multiplies two input numbers. The multiplyUs function should cater to following requirements: 1. Inputs may be signed numbers e.g. "multiplyUs (-2) * (3)" should result in "-6" and "multiplyUs (-2) * (-6)" should result in "12" 2. It should use guard expressions and recursion. 3. No need to write the main function to do user interaction writing definition for "addUs" and "multiplyUs" is sufficient.
D	What are clauses, terms, and structures in Prolog? What are facts, rules, and queries ? (Note: Give examples for each)
E	What are constructors and destructors? Explain with help of example the order of calling of constructors amongst inherited classes.
F	Describe different parameter passing modes for subroutines.

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	B
Q2.	D
Q3.	B
Q4	B
Q5	C
Q6	A
Q7	A
Q8.	B
Q9.	D
Q10.	A
Q11.	B
Q12.	B
Q13.	A
Q14.	A
Q15.	D
Q16.	B
Q17.	A
Q18.	C
Q19.	D
Q20.	A