

COMPUTER SCIENCE (083) QUESTION PAPER 70 MM

	(a)	<p>Carefully observe the following python code and answer the questions that follow:</p> <pre>x=5 def func2(): x=3 global x x=x+1 print x print x</pre> <p>On execution the above code produces the following output.</p> <p>6 3</p> <p>Explain the output with respect to the scope of the variables.</p>	2
	ans	<p>Names declared with global keyword have to be referred at the file level. This is because the global statement indicates that the particular variable lives in the global scope. If no global statement is being used, the variable with the local scope is accessed. Hence, in the above code the statement succeeding the statement global x informs python to increment the global variable x Hence the output is 6 i.e 5+1 which is also the value for global x. When x is reassigned with the value 3 the local x hides the global x and hence 3 is printed.</p>	
	b	<p>Name the modules to which the following functions belong:</p> <p>a. uniform() b. fabs()</p>	1
	ans	<p>a. random() b. math()</p>	
	c	<p>Rewrite the following code after removing the syntactical errors (if any). Underline each correction.</p> <pre>def chksum: x= input("Enter a number") if (x%2 = 0): for i range(2*x): print i loop else: print "#"</pre>	2

	ans	<pre> x= input("Enter a number") if (x%2 == 0): for i in range(2*x): print i else: print "#" </pre>	
	d	<p>Observe the following Python code carefully and obtain the output, which will appear on the screen after execution of it.</p> <pre> def Findoutput(): L = "earn" X="" L1=[] count = 1 for i in L: if i in['a','e','i','o','u']: X=X+i.swapcase() else: if (count%2!=0): X= X+str(len(L[:count])) else: X = X+i count = count+1 print X Findoutput() </pre>	2
	ans	EA3n	
	e	<p>What output will be generated when the following Python code is executed?</p> <pre> def ChangeList(): L=[] L1=[] L2=[] for i in range(1,10): L.append(i) for i in range(10,1,-2): L1.append(i) for i in range(len(L1)): L2.append(L1[i]+L[i]) L2.append(len(L)-len(L1)) print L2 ChangeList() </pre>	3
	ans	[11, 10, 9, 8, 7, 4]	

	F	<p>Observe the following program and answer the questions that follow:</p> <pre>import random X=3 N = random.randint(1,X) for i in range(N): print i,'#',i+1</pre> <p>a. What is the minimum and maximum number of times the loop will execute?</p> <p>b. Find out, which line of output(s) out of (i) to (iv) will not be expected from the program?</p> <ul style="list-style-type: none"> i. 0#1 ii. 1#2 iii. 2#3 iv. 3#4 	2
	ans	<p>a. Minimum Number = 1 Maximum Number = 3</p> <p>b. Line iv is not expected to be a part of the output.</p>	
2	A	Explain the two strategies employed by Python for memory allocation.	2
	ans	<p>Python uses two strategies for memory allocation-</p> <ul style="list-style-type: none"> i. Reference counting ii. Automatic garbage collection. <p>Reference Counting: works by counting the number of times an object is referenced by other objects in the system. When an object's reference count reaches zero, Python collects it automatically.</p> <p>Automatic Garbage Collection: Python schedules garbage collection based upon a threshold of object allocations and object de-allocations. When the number of allocations minus the number of deallocations are greater than the threshold number, the garbage collector is run and the unused block of memory is reclaimed.</p>	

	b	<p>Observe the following class definition and answer the questions that follow:</p> <pre> class Info: ips=0 def __str__(self): #Function 1 return " Welcome to the Info Systems" def __init__(self): self.__Systemdate="" self.SystemTime="" def getinput(self): self.__Systemdate = raw_input("enter data") self.SystemTime=raw_input("enter data") Info.incrips() @staticmethod #Statement 1 def increps(): Info.ips=Info.ips+1 print " System invoked",Info.ips,"times" I=Info() I.getinput() print I.SystemTime print I.__Systemdate # Statement 2 </pre> <p>i. Write statement to invoke Function 1.</p> <p>ii. On Executing the above code , Statement 2 is giving an error explain.</p>	2
	Ans	<p>i. print I</p> <p>ii. The statement 2 is giving an error because __Systemdate is a private variable and hence cannot be printed outside the class.</p>	

	C	<p>Define a class PRODUCT in Python with the following specifications</p> <p>Data members:</p> <p>Pid – A string to store productid.</p> <p>Pname – A string to store the name of the product.</p> <p>Pcostprice – A decimal to store the cost price of the product</p> <p>Psellingprice – A decimal to store Selling Price</p> <p>Margin – A decimal to be calculated as Psellingprice - Pcostprice</p> <p>Remarks – To store "Profit" if Margin is positive else "Loss" if Margin is negative</p> <p>Member Functions:</p> <ul style="list-style-type: none"> • A constructor function to initialize All the data members with valid default values. • A method SetRemarks() that assigns Margin as Psellingprice - Pcostprice and sets Remarks as mentioned below: <table border="0"> <tr> <td>Margin</td><td>Remarks</td></tr> <tr> <td><0 (negative)</td><td>Loss</td></tr> <tr> <td>>0(positive)</td><td>Profit</td></tr> </table>	Margin	Remarks	<0 (negative)	Loss	>0(positive)	Profit	4
Margin	Remarks								
<0 (negative)	Loss								
>0(positive)	Profit								

	<pre> Ans class PRODUCT: def __init__(self): self.Pid = "" self.Pname = "" self.Pcostprice = 0.0 self.Psellingprice = 0.0 self.Margin = 0.0 self.Remarks = "" def SetRemarks(self): self.Margin = self.Psellingprice - self.Pcostprice if (self.Margin <0): self.Remarks="Loss" else: self.Remarks="Profit" def Getdetails(self): self.Pid = raw_input("Enter Product Id") self.Pname = raw_input("Enter Product Name") self.Pcostprice = input("Enter Cost Price") self.Psellingprice =input("Enter Selling Price") self.SetRemarks() def Setdetails(self): print "Product Id" ,self.Pid print "Product Name", self.Pname print "Cost Price",self.Pcostprice print "Selling Price",self.Psellingprice print " Margin:",self.Margin print "Incurred:",self.Remarks </pre>	
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D

Answer the questions (i) to (iv) based on the following:

```
class Shop(object):
    def __init__(self):
        self.no_of_employees = 0
        self.no_of_brands=0
    def getSdata(self):
        self.no_of_employees=input("Number of employees")
        self.no_of_brands=input("Number of brands")
    def showSdata(self):
        print self.no_of_employees
        print self.no_of_brands
class Brand (object):
    def __init__(self):
        self.name = ""
        self.category=["Mens","Womens","Kids"]
        self.avgprice=0.0
    def getdata(self):
        self.name = raw_input("Enter Brand Name")
        self.avgprice = input("Enter Average Price")
    def showdata(self):
        print self.name
        print self.category
        print self.avgprice

class Mall(Brand,Shop):
    def __init__(self):
        self.no_of_shops =0
    def getdata(self):
        super(Mall,self).getSdata()      # Statement1
        super(Mall,self).getdata()      # Statement 2
        self.no_of_shops = input("Enter number of shops")
    def showdata(self):
        print self.no_of_shops
print self.no_of_brands
# Blank 1
```

- i. Which type of Inheritance is demonstrated in the above code?
- ii. Explain Statement 1 and 2.
- iii. Name the methods that are overridden along with their class name.
- iv. Fill Blank1 with a statement to display variable category of class Brand.

	Ans	<p>i. Multiple Inheritance</p> <p>ii. Statement 1 and 2 invoke the <code>getSdata()</code> function of class <code>Shop</code> and <code>getData()</code> function of class <code>Brand</code> respectively.</p> <p>iii. <code>getdata()</code> method of class <code>Brand</code> is overridden. When object of class <code>Mall</code> is created, <code>M = Mall()</code> <code>M.getdata()</code> <code>getdata()</code> method of class <code>Mall</code> is invoked and not of class <code>Brand</code> is called.</p> <p>iv. <code>print Brand().category</code></p>	
3	a	<p>Consider the following unsorted list</p> <p>95 79 19 43 52 3</p> <p>Write the passes of bubble sort for sorting the list in ascending order till the 3rd iteration.</p>	3
	ans	<p>[79, 19, 43, 52, 3, 95]</p> <p>[19, 43, 52, 3, 79, 95]</p> <p>[19, 43, 3, 52, 79, 95]</p>	
	b	<p>Kritika was asked to accept a list of even numbers but she did not put the relevant condition while accepting the list of numbers. You are required to write a user defined function <code>oddtoeven(L)</code> that accepts the List <code>L</code> as an argument and convert all the odd numbers into even by multiplying them by 2 .</p>	2
	ans	<pre>def oddtoeven(L): for i in range(len(L)): if (L[i] % 2 != 0): L[i] = L[i]*2</pre>	
	c	<p>Aastha wants to create a program that accepts a string and <u>display the characters in the reverse order in the same line using a Stack</u>. She has created the following code , help her by completing the definitions on the basis of requirements given below :</p> <p>class mystack:</p> <pre>def __init__(self): self.mystr= # Accept a string self.mylist= # Convert mystr to a list</pre> <p># Write code to display while removing element from the stack.</p> <pre>def display(self): : :</pre>	4

	ans	<pre> class mystack: def __init__(self): self.mystr= raw_input("Enter the string") self.mylist = list(self.mystr) def display(self): x= len(self.mylist) if (x>0): for i in range(x): print self.mylist.pop(), else: pass </pre>																															
	d	Write a generator function generatesq() that displays the square roots of numbers from 100 to n where n is passed as an argument .	2																														
	ans	<pre> import math def generatesq(n): for i in range(100,n): yield(math.sqrt(i)) </pre>																															
	e	Evaluate the following Postfix expression: 20,10,-,15,3,/,+,5,*	2																														
	ans	<table border="1"> <thead> <tr> <th>Symbol</th> <th>Operation</th> <th>stack</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>Push</td> <td>20</td> </tr> <tr> <td>10</td> <td>Push</td> <td>20,10</td> </tr> <tr> <td>-</td> <td>pop</td> <td>10</td> </tr> <tr> <td>15</td> <td>Push</td> <td>10,15</td> </tr> <tr> <td>3</td> <td>push</td> <td>10,15,3</td> </tr> <tr> <td>/</td> <td>Pop</td> <td>10,5</td> </tr> <tr> <td>+</td> <td>pop</td> <td>15</td> </tr> <tr> <td>5</td> <td>Push</td> <td>15,5</td> </tr> <tr> <td>*</td> <td>Pop</td> <td>75</td> </tr> </tbody> </table>	Symbol	Operation	stack	20	Push	20	10	Push	20,10	-	pop	10	15	Push	10,15	3	push	10,15,3	/	Pop	10,5	+	pop	15	5	Push	15,5	*	Pop	75	2
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-	pop	10																															
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/	Pop	10,5																															
+	pop	15																															
5	Push	15,5																															
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4	a	Observe the following code and answer the questions that follow: File = open("Mydata","a") #Blank1 File.close() i. What type (Text/Binary) of file is Mydata? ii. Fill the Blank 1 with statement to write “ABC” in the file “Mydata”	2																														
	ans	i. Text File ii. File.write("ABC")																															

	b	<p>A text file “Quotes.Txt” has the following data written in it:</p> <p>Living a life you can be proud of</p> <p>Doing your best</p> <p>Spending your time with people and activities that are important to you</p> <p>Standing up for things that are right even when it’s hard</p> <p>Becoming the best version of you</p> <p>Write a user defined function to display the total number of words present a file.</p>	2
	Ans	<pre>def countwords(): S= open("Mydata","r") f = S.read() z= f.split() count = 0 for i in z: count = count+1 print "Total number of words",count</pre>	
	c	<p>Consider the following class declaration and answer the question that follows:</p> <pre>import pickle class Student: def __init__(self): self.name="" self.percent=0.0 def inputdata(self): self.name=raw_input("Enter Name") self.percent=input("Enter Percentage scored") def returnpercent(self): return (self.percent) def displaydata(self): print "Name:",self.name print "Percent:",self.percent</pre> <p>Anuj has been asked to display all the students who have scored less than 40 for Remedial Classes.</p> <p>Write a user defined function to display all those students who have scored less than 40 from the binary file “Student.dat” assuming it stores all the object of the class Student mentioned above.</p>	3

	Ans	<pre> def displaydata(): X=open("student.dat", "rb") S = Student() try: while (X): S=pickle.load(X) if (S.returnpercent()<40): S.displaydata() except EOFError: pass X.close() </pre>																															
5	a	<p>Observe the table ‘Club’ given below:</p> <table border="1"> <thead> <tr> <th colspan="5">Club</th> </tr> <tr> <th>Member_id</th> <th>Member_Name</th> <th>Address</th> <th>Age</th> <th>Fee</th> </tr> </thead> <tbody> <tr> <td>M001</td> <td>Sumit</td> <td>New Delhi</td> <td>20</td> <td>2000</td> </tr> <tr> <td>M002</td> <td>Nisha</td> <td>Gurgaon</td> <td>19</td> <td>3500</td> </tr> <tr> <td>M003</td> <td>Niharika</td> <td>New Delhi</td> <td>21</td> <td>2100</td> </tr> <tr> <td>M004</td> <td>Sachin</td> <td>Faridabad</td> <td>18</td> <td>3500</td> </tr> </tbody> </table> <p>i. What is the cardinality and degree of the above given table? ii. If a new column contact_no has been added and three more members have joined the club then how these changes will affect the degree and cardinality of the above given table.</p>	Club					Member_id	Member_Name	Address	Age	Fee	M001	Sumit	New Delhi	20	2000	M002	Nisha	Gurgaon	19	3500	M003	Niharika	New Delhi	21	2100	M004	Sachin	Faridabad	18	3500	2
Club																																	
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M001	Sumit	New Delhi	20	2000																													
M002	Nisha	Gurgaon	19	3500																													
M003	Niharika	New Delhi	21	2100																													
M004	Sachin	Faridabad	18	3500																													
	Ans	<p>Ans i. Cardinality: 4 Degree: 5 ii. Cardinality: 7 Degree: 6</p>																															

	B	Write SQL commands for the queries (i) to (iv) and output for (v) to (viii) based on the tables ‘Watches’ and Sale given below.	6
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Watches

Watchid	Watch_Name	Price	Type	Qty_Store
W001	HighTime	10000	Unisex	100
W002	LifeTime	15000	Ladies	150
W003	Wave	20000	Gents	200
W004	HighFashion	7000	Unisex	250
W005	GoldenTime	25000	Gents	100

Sale

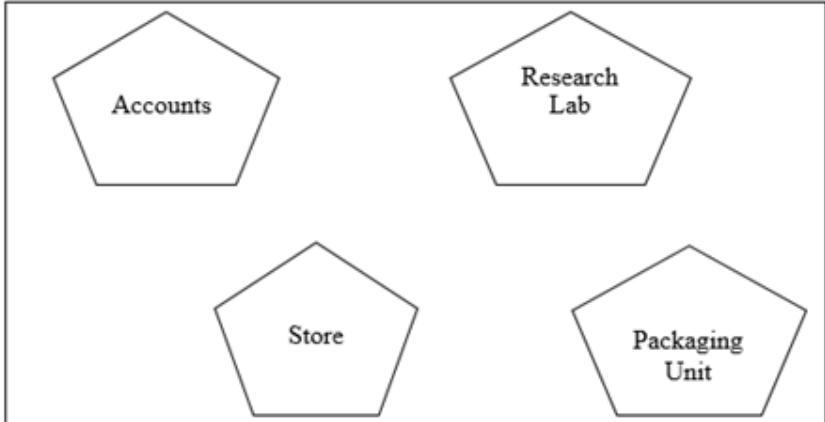
Watchid	Qty_Sold	Quarter
W001	10	1
W003	5	1
W002	20	2
W003	10	2
W001	15	3
W002	20	3
W005	10	3
W003	15	4

- i. To display all the details of those watches whose name ends with ‘Time’
- ii. To display watch’s name and price of those watches which have price range in between 5000-15000.
- iii. To display total quantity in store of Unisex type watches.
- iv. To display watch name and their quantity sold in first quarter.
- v. select max(price), min(qty_store) from watches;
- vi. select quarter, sum(qty_sold) from sale group by quarter;
- vii. select watch_name,price,type from watches w, sale s where w.watchid!=s.watchid;
- viii. select watch_name, qty_store, sum(qty_sold), qty_store-sum(qty_sold) “Stock” from watches w, sale s where w.watchid=s.watchid group by s.watchid;

- | | |
|-----|---|
| ans | <ol style="list-style-type: none"> i. select * from watches where watch_name like ‘%Time’ ii. select watch_name, price from watches where price between 5000 and 15000; iii. select sum(qty_store) from watches where type like ‘Unisex’; |
|-----|---|

		<p>iv. select watch_name,qty_sold from watches w,sale s where w.watchid=s.watchid and quarter=1;</p> <p>v.</p> <table border="1"> <thead> <tr> <th>max(price)</th><th>min(qty_store)</th></tr> </thead> <tbody> <tr> <td>25000</td><td>100</td></tr> </tbody> </table> <p>vi.</p> <table border="1"> <thead> <tr> <th>quarter</th><th>sum(qty_sold)</th></tr> </thead> <tbody> <tr> <td>1</td><td>15</td></tr> <tr> <td>2</td><td>30</td></tr> <tr> <td>3</td><td>45</td></tr> <tr> <td>4</td><td>15</td></tr> </tbody> </table> <p>vii.</p> <table border="1"> <thead> <tr> <th>watch_name</th><th>price</th><th>type</th></tr> </thead> <tbody> <tr> <td>HighFashion</td><td>7000</td><td>Unisex</td></tr> </tbody> </table> <p>Viii</p> <table border="1"> <thead> <tr> <th>watch_name</th><th>qty_store</th><th>qty_sold</th><th>Stock</th></tr> </thead> <tbody> <tr> <td>HighTime</td><td>100</td><td>25</td><td>75</td></tr> <tr> <td>LifeTime</td><td>150</td><td>40</td><td>110</td></tr> <tr> <td>Wave</td><td>200</td><td>30</td><td>170</td></tr> <tr> <td>GoldenTime</td><td>100</td><td>10</td><td>90</td></tr> </tbody> </table>	max(price)	min(qty_store)	25000	100	quarter	sum(qty_sold)	1	15	2	30	3	45	4	15	watch_name	price	type	HighFashion	7000	Unisex	watch_name	qty_store	qty_sold	Stock	HighTime	100	25	75	LifeTime	150	40	110	Wave	200	30	170	GoldenTime	100	10	90	
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6	a	What do you understand by the following terms i)cyber bullying ii)cookies	2																																								
	Ans	The use of electronic communication to bully a person, typically by sending messages of an intimidating or threatening nature. "children may be reluctant to admit to being the victims of cyberbullying" ii) A cookie is a text file that a Web browser stores on a user's machine. Cookies are a way for Web applications to maintain application state. They are used by websites for authentication, storing website information/preferences, other browsing information and anything else that can help the Web browser while accessing Web servers.																																									
	b	Difference between digital signature and digital certificate	2																																								
	Ans	The use of a digital certificate to sign documents. ... So, technically speaking the difference between a digital signature and a digital certificate is that a certificate binds a digital signature to an entity, whereas a digital signature is to ensure that a data/information remain secure from the point it was issued.																																									

	c	What do you mean by web browser and web server?	2
	Ans	A web browser is an application software which acts as an interface between server and client and allows us to view and explore documents on the internet. While web server is a computer which is used for storing and hosting the web content.	
	d	What do you mean by wi-fi and IR	2
	ans	Wi-Fi is the name of a popular wireless networking technology that uses radio waves to provide wireless high-speed Internet and network connections. Infrared (IR) is a wireless mobile technology used for device communication over short ranges. IR communication has major limitations because it requires line-of-sight, has a short transmission range and is unable to penetrate walls.	
	e	What do you mean by firewall? Explain its use in modern scenario	2
	ans	A firewall is software used to maintain the security of a private network. Firewalls block unauthorized access to or from private networks and are often employed to prevent unauthorized Web users or illicit software from gaining access to private networks connected to the Internet. A firewall may be implemented using hardware, software, or a combination of both.	
7	a	Identify the type of topology on the basis of the following: a. Since every node is directly connected to the server, a large amount of cable is needed which increases the installation cost of the network. b. It has a single common data path connecting all the nodes.	2
	ans	a. Star Topology b. Bus Topology	
	(b)	Expand the following: a. VOIP b. SMTP	2
	Ans:	a. Voice Over Internet Protocol b. Simple Mail Transfer Protocol	
	(c)	Who is a hacker?	1
	Ans:	A computer enthusiast, who uses his computer programming skills to intentionally access a computer without authorization is known as hacker. A hacker accesses the computer without the intention of destroying data or maliciously harming the computer.	

	(d)	<p>The following is a 32 bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) separated by decimal points.</p> <p style="text-align: center;">140.179.220.200</p> <p>What is it? What is its importance?</p>	1													
	Ans:	<p>It is an IP Address. It is used to identify the computers on a network.</p>														
	(e)	<p>Daniel has to share the data among various computers of his two offices branches situated in the same city. Name the network (out of LAN, WAN, PAN and MAN) which is being formed in this process.</p>	1													
	Ans	MAN														
	(f)	<p>Rehaana Medicos Center has set up its new center in Dubai. It has four buildings as shown in the diagram given below:</p> 	2													
		<p>Distances between various buildings are as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="padding: 5px;">Accounts to Research Lab</td> <td style="padding: 5px; text-align: right;">55 m</td> <td rowspan="6" style="width: 10%; vertical-align: middle;"></td> </tr> <tr> <td style="padding: 5px;">Accounts to Store</td> <td style="padding: 5px; text-align: right;">150 m</td> </tr> <tr> <td style="padding: 5px;">Store to Packaging Unit</td> <td style="padding: 5px; text-align: right;">160 m</td> </tr> <tr> <td style="padding: 5px;">Packaging Unit to Research Lab</td> <td style="padding: 5px; text-align: right;">60 m</td> </tr> <tr> <td style="padding: 5px;">Accounts to Packaging Unit</td> <td style="padding: 5px; text-align: right;">125 m</td> </tr> <tr> <td style="padding: 5px;">Store to Research Lab</td> <td style="padding: 5px; text-align: right;">180 m</td> </tr> </tbody> </table>	Accounts to Research Lab	55 m		Accounts to Store	150 m	Store to Packaging Unit	160 m	Packaging Unit to Research Lab	60 m	Accounts to Packaging Unit	125 m	Store to Research Lab	180 m	
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		<table border="1"> <thead> <tr> <th colspan="2">Number of Computers</th></tr> </thead> <tbody> <tr> <td>Accounts</td><td>25</td></tr> <tr> <td>Research Lab</td><td>100</td></tr> <tr> <td>Store</td><td>15</td></tr> <tr> <td>Packaging Unit</td><td>60</td></tr> </tbody> </table> <p>As a network expert, provide the best possible answer for the following queries:</p> <ol style="list-style-type: none"> Suggest a cable layout of connections between the buildings. Suggest the most suitable place (i.e. buildings) to house the organization Suggest the placement of the following device with justification: a) Repeater b) Hub/Switch Suggest a system (hardware/software) to prevent unauthorized access to or from the network. 	Number of Computers		Accounts	25	Research Lab	100	Store	15	Packaging Unit	60	
Number of Computers													
Accounts	25												
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	ans	<p>i)</p> <p>ii) Suitable place /building to house server of this organization would be building Research Lab, as this building contains the maximum number of computers.</p> <p>iii.a) For layout1, since the cabling distance between Accounts to Store is quite large, so a repeater would ideally be needed along their path to avoid loss of signals during the course of data flow in this route. For layout2, since the cabling distance between Store to Research Lab is quite large, so a repeater would ideally be placed.</p> <p>(iv) Firewall</p>											