**SAMPLE PAPER -I**

**Computer Science (Code: 083)**

**Class XII**

**Marking Scheme**

**Time: 3 Hrs. MM: 70**

Instructions:

i. All Questions are Compulsory.

ii. Programming Language: Python

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | (a) | Write names of two mutable data types and two immutable data types available in python. | 2 |
|  | Ans | Mutable data type: List, Dictionary  Immutable Data type: Tuple, String |  |
|  |  | (1/2 mark for each correct data type) |  |
|  | (b) | Name the python library module which need to be imported to run the following program:  print (sqrt(random.randint(1,16) | 1 |
|  | Ans | math, random |  |
|  |  | (1/2 mark for each correct answer) |  |
|  | (c ) | Rewrite the following code in python after removing all syntax error(s). Underlining each correction done in the code.  30=x  For I in range(2,6)  if x>30:  print(“true”)  else  Print(“False”) | 2 |
|  | Ans | x=30  for I in range(2,6):  if x>30:  print(“true”)  else:  print(“False”) |  |
|  |  | (1/2 mark for each correction not exceeding 2 marks)  Or  ( 1 mark for identifying the errors, without suggesting correction) |  |
|  | (d) | Find and write the output of the following python code:  Msg="CompuTer"  Msg1=''  for i in range(0, len(Msg)):  if Msg[i].isupper():  Msg1=Msg1+Msg[i].lower()  elif i%2==0:  Msg1=Msg1+'\*'  else:  Msg1=Msg1+Msg[i].upper()  print(Msg1) | 2 |
|  | Ans | cO\*P\*t\*R |  |
|  |  | (2 mark for correct answer and ½ mark for partially correct answer) |  |
|  | (e) | Find and write the output of the following python code:  def Alter(x,y=20):  x=x\*y  y=x%y  print (x,'\*',y)  return (x)  a=200  b=30  a=Alter(a,b)  print (a,'$',b)  b=Alter(b)  print (a,'$', b)  a=Alter(a)  print (a,'$',b) | 3 |
|  | Ans | 6000 \* 0  6000 $ 30  600 \* 0  6000 $ 600  120000 \* 0  120000 $ 600 |  |
|  |  | ½ marks for each correct line of output  Deduct ½ marks for not writing ‘\*’and ‘$’ symbol correctly |  |
|  | (f) | What possible outputs are expected to be displayed on the screen at the time of execution of the program from the following code? Also specify the minimum and maximum values that can be assigned to the variable c.  import random  temp=[10,20,30,40,50,60]  c=random.randint(0,4)  for I in range(0, c):  print(temp[i],”#”)   1. 10#20# (ii) 10#20#30#40#50#   (iii). 10#20#30# (iv) 50#60# | 2 |
|  | Ans | (i) & (iii) Minimum value of C is 0 and Maximum value is 3 |  |
|  |  | 1/2 mark for writing each correct answer not exceeding 1  ½ mark for minimum value of c  ½ mark for maximum value of c |  |
| 2 | (a) | Write a recursive function to calculate the Fibonacci Series up to n terms. | 2 |
|  | Ans | def Fibo(n):  if n<=1:  return n  else:  return (Fibo(n-1)+Fibo(n-2) |  |
|  |  | ½ mark for declaration of correct function header and 1.5 mark for logic |  |
|  | (b) | Write a statement in python to open a text file REWRITE.TXT so that new content can be read or written from it. | 1 |
|  | Ans | file=open(“REWRITE.TXT”, “w”)  Or  file=open(“REWRITE.TXT”, “w+”)  Or  file=open(“REWRITE.TXT”, “r”) |  |
|  |  | 1 mark for correct statement |  |
|  | (c) | A text file “Quotes.Txt” has the following data written in it:  Living a life you can be proud of  Doing your best  Spending your time with people and activities that are important to you  Standing up for things that are right even when it’s hard  Becoming the best version of you  Write a user defined function to display the total number of words present in the file. | 2 |
|  | Ans | 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)  ***(½ mark for reading the file using read)***  ***(½ mark for correctly using split())***  ***(½ mark for the correct loop)***  ***(½ mark for displaying the correct value of count)*** |  |
| 3 | (a) | Consider the following unsorted list  95 79 19 43 52 3  Write the passes of bubble sort for sorting the list in ascending order till the 3rd iteration. | 3 |
|  | Ans | [79, 19, 43, 52, 3, 95]  [19, 43, 52, 3, 79, 95]  [19, 43, 3, 52, 79, 95]  (1 mark for each correct iteration in sequence.) |  |
|  | (b) | Name the function that you will to create a line chart and Pie Chart. | 2 |
|  | Ans | matplotlib.pyplot.plot()  matplotlib.pyplot.pie() |  |
|  |  | 1 mark for each correct function |  |
|  | (c ) | Define Big-O notation. State the two factors determine the complexity of algorithm. | 2 |
|  | Ans | It is used to depict an algorithm’s growth rate. **The growth rate determines the algorithm’s performance when its input size grows. Through Big-O, the upper bound of the algorithm’s performance is specified.**  **Internal Factors:** a) Time required to run b) Space of memory required to run  **External Factor:** a) Size of the input b) Speed of computer c) Quality of the computer |  |
|  |  | 1 mark for definition and 1 mark for factor satement |  |
|  | (d) | Calculate the time complexity of the Insertion sort. | 2 |
|  |  | aList=[15,6,13,22,3,52,12] 🡪 takes constant time say c0  print(‘Original list if ‘, aList) 🡪 takes constant time say c1  n=len(aList) 🡪 takes constant time say c2  for i in range(1, n): 🡪 takes constant time say c3 and repeats n times  key=aList[i] 🡪 takes constant time say c4  j=i-1 🡪 takes constant time say c5  while j>=0 and key<aList[j]: 🡪 takes constant time say c6 and repeats n tmes  aList[j+1]=aList[j] 🡪 takes constant time say c7  j=j-1 🡪 takes constant time say c8  else:  aList[j+1]=key 🡪 takes constant time say c9  print(‘List after sorting :’, aList) 🡪 takes constant time say c10  Total time taken= c0+c1+c2+c10+n(c3+c4+c5+n(c6+c7+c8+c9))  =c0+c1+c2+c10+n(c3+c4+c5)+n2(c6+c7+c8+c9)  Time complexity= O(n2) |  |
|  |  | 2 marks for correct answer with correct steps and 1 mark for correct answer |  |
|  | (e ) | Evaluate the following postfix using stack & show the content of the stack after the execution  of each:  20, 4, +, 3, -, 7, 1 | 2 |
|  | Ans | |  |  |  |  |  | | --- | --- | --- | --- | --- | | S.no | Symbol | Operation | Stack | Result | | 1 | 20 | Push(20) | 20 |  | | 2 | 4 | Push(4) | 20,4 |  | | 3 | + | Pop(4) | 20 |  | | 4 |  | Pop(20) |  |  | |  |  | Perform(20+4) |  |  | |  |  | Push(24) | 24 |  | | 5 | 3 | Push(3) | 24,3 |  | | 6 | - | Pop(3) | 24 |  | |  |  | Pop(24) |  |  | |  |  | Perform(24-3) |  |  | |  |  | Push(21) | 21 |  | | 7 | 7 | Push(7) | 21,7 |  | | 8 | / | Pop(7) | 21 |  | |  |  | Pop(21) |  |  | |  |  | Perform(21/7) |  |  | |  |  | Push(3) | 3 |  | | 9 |  | Pop(3) |  | Result=3 | |  |
|  |  | [½ mark each for correctly evaluating expression up to each operator.]  [½ mark for correct answer] |  |
|  | ( f) | Write functions to perform insert and delete operation in a Queue | 4 |
|  |  | def qins(Qu, item):  Qu.append(item)  if len (Qu)==1:  front=rear=0  else:  rear=len(Qu)-1  def qdel(Qu):  if isEmpty(Qu):  return ‘Underflow’  else:  item=Qu.pop(0)  if len(Qu)==0:  front=rear=None  return item |  |
|  |  | ½ mark for function header of each and 1.5 mark for correct logic of each |  |
| 4 | (a) | Write the expanded name for the following abbreviated terms used in Networking and Communication:   1. SMTP (ii) NFC (iii) FTP (iv) VoIP | 2 |
|  |  | 1. Simple mail transfer protocol (ii) Near Field Communication (iii) File transfer protocol (iv) Voice over internet protocol |  |
|  |  | ½ marks for each correct answer |  |
|  | (b) | 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. | 1 |
|  | Ans | MAN  ***(1 mark for correct answer)*** |  |
|  | (c ) | What are the enabling technologies of IoT system. | 1 |
|  | Ans | RFID, Sensors, Smart Technologies, Efficient network connectivity |  |
|  |  | ½ mark for two correct technology |  |
|  | (d) | What is CSMA/CA? How does it works. | 2 |
|  | Ans | In CSMA/CA, as soon as a node receives a packet that is to be sent, it checks to be sure the channel is clear (no other node is transmitting at the time). If the channel is clear, then the packet is sent. If the channel is not clear, the node waits for a randomly chosen period of time, and then checks again to see if the channel is clear. This period of time is called the backoff factor, and is counted down by a backoff counter. If the channel is clear when the backoff counter reaches zero, the node transmits the packet. If the channel is not clear when the backoff counter reaches zero, the backoff factor is set again, and the process is repeated. |  |
|  |  | 1 mark for definition and 1 mark for working |  |
|  | (e ) | Rehaana Medicos Center has set up its new center in Dubai. It has four buildings as shown in the diagram given below:  Research  Lab  Accounts  Packaging  Unit  Store  Distance between various building are as follows:   |  |  | | --- | --- | | Accounts to research Lab | 55m | | Accounts to store | 150m | | Store to packaging unit | 160m | | Packaging unit to research lab | 60m | | Accounts to packaging unit | 125m | | Store to research lab | 180m |   Number of Computers   |  |  | | --- | --- | | Accounts | 25 | | Research Lab | 100 | | Store | 15 | | Packaging Unit | 60 |   As a network expert, provide the best possible answer for the following queries:  i) Suggest a cable layout of connections between the buildings.  ii) Suggest the most suitable place (i.e. buildings) to house the server of this organization.  iii) Suggest the placement of the following device with justification:  a) Repeater b) Hub/Switch  iv) Suggest a system (hardware/software) to prevent unauthorized access to or from the network. | (e ) |
|  | Ans | 1. Layout   Research  Lab  Accounts  Packaging  Unit  Store  **(1 mark for drawing any correct layout)**  (ii)The most suitable place/ building to house the server of this organization would be building Research Lab, as this building contains the maximum number of computers.  **(1 mark for correct answer)**  (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 Recresearch Lab is quite large, so a repeater would ideally be placed.  b) In both the layouts, a Hub/Switch each would be needed in all the buildings to interconnect the group of cables from the different computers in each building.  **(½ mark for each correct answer)**  (iv) Firewall  **(1 mark for correct answer)** |  |
|  | (f) | Discuss how IPv4 is differs from IPv6. | 2 |
|  |  | An IP address is binary numbers but can be stored as text for human readers. For example, a 32-bit numeric address (IPv4) is written in decimal as four numbers separated by periods. Each number can be zero to 255. For example, 1.160.10.240 could be an IP address.  IPv6 addresses are 128-bit IP address written in hexadecimal and separated by colons |  |
|  |  | 1 mark for one difference |  |
|  | (g) | What is network congestion? What are its symptoms? | 2 |
|  |  | ust like in road congestion, Network Congestion occurs when a network is not able to adequately handle the traffic flowing through it. While network congestion is usually a temporary state of a network rather than a permanent feature, there are cases where a network is always congested signifying a larger issue is at hand.  Symptoms: Excessive packet delay, Use of data packets, Retransmission |  |
|  |  | 1 mark for definition and 1 mark for symptoms |  |
|  | (h) | Name any two network tools. | 1 |
|  |  | Ping, whois lookup |  |
|  |  | ½ mark for each tool |  |
|  | (a) | Define degree and cardinality. Based upon given table write degree and  cardinality.  **PATIENTS**   |  |  |  |  | | --- | --- | --- | --- | | PatNo | PatName | Dept | DocID | | 1 | Leena | ENT | 100 | | 2 | Supreeth | Ortho | 200 | | 3 | Madhu | ENT | 100 | | 4 | Neha | ENT | 100 | | 5 | Deepak | Ortho | 200 | | 2 |
|  | Ans | Degree=4  Cardinality=5  1 mark for degree and 1 mark for cardinality |  |
|  | (b) | Write SQL commands for the queries (i) to (iv) and output for (v) & (viii) based  on a table COMPANY and CUSTOMER .  **COMPANY**   |  |  |  |  | | --- | --- | --- | --- | | CID | NAME | CITY | PRODUCTNAME | | 111 | SONY | DELHI | TV | | 222 | NOKIA | MUMBAI | MOBILE | | 333 | ONIDA | DELHI | TV | | 444 | SONY | MUMBAI | MOBILE | | 555 | BLACKBERRY | MADRAS | MOBILE | | 666 | DELL | DELHI | LAPTOP |   **CUSTOMER**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | CUSTID | NAME | PRICE | QTY | CID | | 101 | Rohan Sharma | 70000 | 20 | 222 | | 102 | Deepak Kumar | 50000 | 10 | 666 | | 103 | Mohan Kumar | 30000 | 5 | 111 | | 104 | Sahil Bansal | 35000 | 3 | 333 | | 105 | Neha Soni | 25000 | 7 | 444 | | 106 | Sonal Aggarwal | 20000 | 5 | 333 | | 107 | Arjun Singh | 50000 | 15 | 666 |   (i) To display those company name which are having price less than 30000.  (ii) To display the name of the companies in reverse alphabetical order.  (iii) To increase the price by 1000 for those customer whose name starts with ‘S’  (iv) To add one more column totalprice with decimal(10,2) to the table customer  (v) SELECT COUNT(\*) ,CITY FROM COMPANY GROUP BY CITY;  (vi) SELECT MIN(PRICE), MAX(PRICE) FROM CUSTOMER WHERE QTY>10 ;  (vii) SELECT AVG(QTY) FROM CUSTOMER WHERE NAME LIKE “%r%;  (viii) SELECT PRODUCTNAME,CITY, PRICE FROM COMPANY,CUSTOMER  WHERE COMPANY.CID=CUSTOMER.CID AND PRODUCTNAME=”MOBILE”; | (b) |
|  | Ans | 1. select name from customer where price <30000;   ½ mark for writing correct select clause or 1 mark for writing correct query |  |
|  |  | 1. select name from company order by name desc.   ½ mark for writing correct select clause or 1 mark for writing correct query |  |
|  |  | 1. update customer set price=price+1000 where name like “S%”;   ½ mark for writing correct update clause or 1 mark for writing correct query |  |
|  |  | 1. alter table customer add totalprice decimal(10,2);   ½ mark for writing correct alter clause or 1 mark for writing correct query |  |
|  |  | 1. count(\*) city   3 DELHI  2 MUMBAI   1. MADRAS   ½ mark for writing correct output |  |
|  |  | 1. MIN(PRICE) MAX(PRICE)   50000 70000  ½ mark for writing correct output |  |
|  |  | 1. AVG(QTY)   12  ½ mark for writing correct output |  |
|  |  | 1. PRODUCTNAME CITY PRICE   MOBILE MUMBAI 70000  MOBILE MUMBAI 25000  ½ mark for writing correct output |  |
| 6 | (a) | What is secured data transmission? What technical ways are used to ensure the secure data transmission? | 2 |
|  |  | secure transmission refers to the transfer of data such as confidential or proprietary information over a secure channel. Many secure transmission methods require a type of encryption.  Technical ways:  E-mail encryption. A number of vendors offer products that encrypt e-mail messages, are easy to use and provide the ability to send private data, including e-mail attachments, securely. ...  Web site encryption. ...  Application encryption. ...  Remote user communication. ...  Laptops and PDAs. ...  Wireless networks. |  |
|  |  | 1 mark for definition and 1 mark for technical ways |  |
|  | (b) | Expand the terms:   1. GNU b) FLOSS | 2 |
|  |  | 1. GNU’s not Unix b) Free Libre open source softwares |  |
|  |  | 1 mark for each correct answer |  |
|  | (c ) | What is intellectual property? What do you understand by intellectual property right? | 2 |
|  |  | Intellectual property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce.  A right that is had by a person or by a company to have exclusive rights to use its own plans, ideas, or other intangible assets without the worry of competition, at least for a specific period of time. These rights can include copyrights, patents, trademarks, and trade secrets. |  |
|  |  | 1 mark for definition and 1 mark for definition of right |  |
|  | (d) | What is cybercrime? Give example. | 2 |
|  |  | Cybercrime is defined as a crime in which a computer is the object of the crime (hacking, phishing, spamming) or is used as a tool to commit an offense (child pornography, hate crimes). Cybercriminals may use computer technology to access personal information, business trade secrets or use the internet for exploitative or malicious purposes. Criminals can also use computers for communication and document or data storage. Criminals who perform these illegal activities are often referred to as hackers. |  |
|  |  | 1 mark for definition and 1 mark for example |  |
|  | (e) | What is identity theft? | 2 |
|  |  | Identity theft, also known as identity fraud, is a crime in which an imposter obtains key pieces of personally identifiable information, such as Social Security or driver's license numbers, in order to impersonate someone else. |  |
|  |  | 2 mark for correct answer |  |
| 7 | (a) | What is Django templates? | 2 |
|  |  | A Django template is a string of text that is intended to separate the presentation of a document from its data. A template defines placeholders and various bits of basic logic (template tags) that regulate how the document should be displayed. |  |
|  |  | 2 marks for correct answer |  |
|  | (b) | Name the file data found in project web application folder. | 1 |
|  |  | \_\_init\_\_.py, settings.py, urls.py, wsgi.py |  |
|  |  | ½ marks for two correct answer |  |
|  | (c) | Identify the view functions from the following URL confs and write their function header.   1. path(‘home/’,views.main) b) path(‘home/check/’,views.newone)   c)path(‘check/’,views.onenew) d) path(‘check/home/’,views.core) | 2 |
|  |  | 1. def main(request): b) def newone(request): c) def onenew(request): e) def core(request) |  |
|  |  | ½ marks for each correct answer |  |
|  | (d) | What is database connectivity? Which package must be imported in python to create a database connectivity application? | 2 |
|  | Ans | Database connectivity refers to connection and communication between an application and the database system.  Package for connectivity:  Mysql.connector |  |
|  |  | 1 mark for definition and 1 mark for package |  |