

# CBSE

## Solved Paper 2023

### Informatics Practices

#### Class-12<sup>th</sup>

(Delhi & Outside Delhi Set)

Time : 3 Hours

Max. Marks : 70

#### General Instructions :

- (i) This question paper contains five sections, Section A to E.
- (ii) All questions are compulsory.
- (iii) Section A have 18 questions carrying 1 mark each.
- (iv) Section B has 7 Very Short Answer type questions carrying 2 marks each.
- (v) Section C has 5 Short Answer type questions carrying 3 marks each.
- (vi) Section D : has 3 Long Answer type questions carrying 5 marks each.
- (vii) Section E has 2 questions carrying 4 marks each. One internal choice is given in Q. 35 against Part E only.
- (viii) All programming question are to be answered using python language only.

#### PART - A

1. Which of the following topologies is very efficient and all nodes are connected to a central hub ? 1
  - (a) Star
  - (b) Tree
  - (c) Bus
  - (d) Ring
2. Ramandeep is a young woman with great aspirations and has a good team of like-minded people. She along with her team members started a company to sell handicrafts online and also designed a logo for their company. What type of intellectual property does this logo represent? 1
  - (a) Patents
  - (b) Copyright
  - (c) Design
  - (d) Trademark
3. Which of the following is a type of cybercrime where objectionable and demeaning comments are posted on social media platform about a person, such that he/she is mentally harassed? 1
  - (a) Fishing
  - (b) Hacking
  - (c) Cyber bullying
  - (d) Identity Theft
4. Which of the following is the correct output of the following SQL command ? 1

SELECT ROUND (7876. 4568, 2);

  - (a) .7876.46
  - (b) 7876.45
  - (c) 7900
  - (d) 7900.4568
5. Aggregate functions are also known as: 1
  - (a) Scalar Functions
  - (b) Single Row Functions
  - (c) Multiple Row Functions
  - (d) Hybrid Functions
6. Primary law in India for matters related to e-commerce and cyber crime is: 1
  - (a) IT Act 1995
  - (b) IT Act 2000
  - (c) IT Act 1998
  - (d) IT Act 2010
7. Ravisha has stored the records of all students of her class in a MYSQL table. Suggest a suitable SQL clause that she should use to display the names of students in alphabetical order. 1
  - (a) SORT BY
  - (b) ALIGN BY
  - (c) GROUP BY
  - (d) ORDER BY
8. To remove the leading and trailing space from data values in a column of MySql Table, we use 1
  - (a) Left ( )
  - (b) Right ( )
  - (c) Trim ( )
  - (d) Ltrim ( )

9. If the substring is not present in a string, the INSTR ( ) returns: 1  
 (a) -1 (b) 1  
 (c) NULL (d) 0
10. What will be the output of the following code ? 1  
 import pandas as pd  
 myser = pd.Series ([0, 0, 0])  
 print (myser)  
 (a) 0 0 (b) 0 1  
       0 0               0 1  
       0 0               0 2  
 (c) 0 0 (d) 0 0  
       1 0               1 1  
       2 0               2 2
11. Which of the following is a two-dimensional labelled data structure of Python? 1  
 (a) Relation (b) Data frame  
 (c) Series (d) Square
12. To compare data values of commission earned by salesmen over a year, which of the following type of graph should preferably be used? 1  
 (a) line (b) area  
 (c) bar (d) scatter
13. Which of the following is not a web browser? 1  
 (a) Opera (b) Google Chrome  
 (c) Linux (d) Mozilla Firefox
14. Which of the following is not a valid aggregate function in MYSQL? 1  
 (a) COUNT ( ) (b) SUM ( )  
 (c) MAX ( ) (d) LEN ( )
15. The digital footprint that we leave online unintentionally is called 1  
 (a) Active digital footprint (b) Passive digital footprint  
 (c) True digital footprint (d) False digital footprint
16. E-waste is responsible for the degradation of our environment if not properly treated or disposed of. Some of the feasible methods of e-waste management are reduce, \_\_\_\_\_ and recycle. 1  
 (a) Reuse (b) Recheck  
 (c) Resubmit (d) Regular

**Direction of 17 and 18**

ASSERTION (A) and REASONING (R) based questions.

Mark the correct choice as

- (i) Both (A) and (R) are true and (R) is the correct explanation for (A).  
 (ii) Both (A) and (R) are true and (R) is not the correct explanation for (A).  
 (iii) (A) is true and (R) is false.  
 (iv) (A) is false but (R) is true.
17. **Assertion (A)** : A static web page does not change for each person visiting the web page. 1  
**Reason (R)** : When a web server receives a request for a dynamic web page, it locates and updates the page and sends it to the browser of the client.
18. **Assertion (A)** : The output of addition of two series will be NaN, if one of the elements or both the elements have no value(s). 1  
**Reason (R)** : While performing mathematical operations on a series, by default all missing values are filled in with 0.

**PART - B**

19. What is a web server ? How is it different from web browser ? 2  
 OR  
 What do you understand by the term cookies ? Give any two benefits of cookies. 2

20. Keshav has written the following query to find out the sum of bonus earned by the employees of WEST zone:  
`SELECT zone, TOTAL (bonus) FROM employee HAVING zone = 'WEST';`  
 But he got an error. Identify the errors and rewrite the query by underlining the corrections(s) done. 2
21. Differentiate between `COUNT ()` and `COUNT (*)` functions in `MYSQL`. Give suitable examples to support your answer. 2
22. Write a Python program to create a series object, `country` using a list that stores the capital of each country.  
**Note:** Assume four countries to be used as index of the series object are India, UK, Denmark, and Thailand having their capitals as New Delhi, London, Copenhagen, and Bangkok respectively. 2
23. Explain plagiarism with an example. 2

**OR**

- Nowadays all of us frequently use social media to connect with our friends. Give any two netiquettes that we should follow while communicating on social media. 2
24. What will be the output of the following code: 2
- ```
import pandas as pd
s1 = pd.Series (data=2*(3, 10))
print (s1)
```
25. Carefully observe the following code: 2
- ```
import pandas as pd
dic = {'pid' : [101, 102, 103, 104, 105],
'pname' : ['Shyam', 'Roushan', 'Archit', 'Medha', 'Lalit'],
'sports' : ['Cricket', 'Tennis', 'Football', 'Cricket', 'Cricket'],
'points' : [45000, 20000, 15000, 53000, 60000]}
player = pd. Data Frame (dic)
print (player)
```
- Write Python statements for the following:**
- (i) In the data frame player created above, set the row labels as 'Player 1', 'Player 2', 'Player 3', 'Player 4', 'Player 5'.
- (ii) Rename the column 'points' to 'net point' in the Data Frame player.

### SECTION - C

26. Consider the table Patient given below and write SQL commands.

**Table : Patient**

Patient id	Name	City	Phone	Date of adm	Department
1000001	Ritvik Garg	Delhi	68476213	2021-12-10	Surgery
1000002	Rahil Arora	Mumbai	36546321	2022-01-08	Medicine
1000003	Mehak Bhatt	Delhi	68421879	2022-02-02	Cardiology
1000004	Soumik Rao	Delhi	26543266	2022-01-11	Medicine
1000005	Suresh Sood	Bangalore	65432442	2021-03-09	Surgery

- (i) Display the details of all patients who were admitted in January.
- (ii) Count the total number of patients from Delhi.
- (iii) Display the last 2 digits of the Patient id of all patients from Surgery Department. 3
27. Kavyanjali, a chemical analyst, needs to arrange data of few elements in the form of two series containing symbols and their atomic numbers respectively. Thereafter, the data of these two series has to be arranged and displayed in the form of Data Frame as shown below:

	Symbol	Atomic Number
Hydrogen	H	1
Helium	He	2
Lithium	Li	3
Beryllium	Be	4

Help her in writing suitable Python code to complete the task. 3

28. Consider the given Data-Frame 'health'.

3

	Disease name	Agent
0	Common cold	Virus
1	Chickenpox	Virus
2	Cholera	Bacteria
3	Tuberculosis	Bacteria

Write suitable Python statements for the following:

- Remove the row containing details of disease named Tuberculosis.
  - Add a new disease named 'Malaria' caused by 'Protozoa'.
  - Display the last 2 rows.
29. Manohar received an email from a company, named Make money Pvt. Ltd., claiming that Manohar has won ₹20 lakhs in a survey done online. In order to claim the prize money, he was required to answer few security questions such as his Name, Account number, PAN card details, Phone number and OTP for verification purposes. For this, he had to click on the link provided in the email.

Answer the following questions:

- Should Manohar give the required details to the company?
- What is the activity depicted above?
- What should he do with this email?

3

OR

What do you understand by the term Hacking? Write any two measures that one should take to avoid being the victim of hacking.

3

30. Write the output (i-iii) for the following SQL commands.

3

Table : FASHION

ID	Product	Price	Qty
F01	Kajal	970	10
F02	Foundation	2100	15
F03	Night Cream	1700	20
F04	Day Cream	1400	10
F05	Shampoo	1200	25
F06	Lipstick	850	32

- SELECT COUNT (Product) FROM FASHION;
- SELECT SUM (Price\*Qty) FROM FASHION WHERE Product = "Night Cream";
- SELECT LEFT (Product, 4) FROM FASHION WHERE Price > 1500;

OR

Find the output of the following SQL queries:

3

- SELECT SUBSTR ("CLIMATE CHANGE", 4, 4);
- SELECT UCASE (RIGHT ("Pollution", 3) );
- SELECT LENGTH ("HAPPY") + 3;

## SECTION - D

31. Write the SQL queries which will perform the following operations:

5

- To display the year from your Date of Admission which is '2023-05-15'.
- To convert your email id 'ABC@XYZ.com' to lowercase.
- To remove leading spaces from a string 'my country'.
- To display current date.
- To display the value of  $10^6$ .

OR

Consider a table **PRODUCT** with the following data:

Table : **PRODUCT**

S. No	Item name	Company	Stock-date	Price	Discount
1	Monitor	HP	2021-12-20	15499.739	15
2	Webcam	Logitech	2020-02-03	4890.90	5
3	Keyboard	Logitech	2022-08-19	1878-985	30
4	Mouse	HCL	2021-05-16	1200.00	7
5	Speakers	iBall	2021-10-19	NULL	25

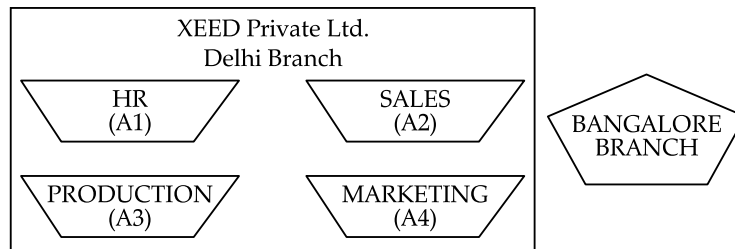
Write SQL queries using SQL functions to perform the following operations:

5

- (i) Display the first 3 characters of all Item names.
  - (ii) Display the names of all items whose Stock day is "Monday".
  - (iii) Display the total price of all the products.
  - (iv) Display the maximum Price.
  - (v) Display the average Price of all the products by the company named 'Logitech'.
32. XEED Private Ltd., Delhi is a company that deals with educational toys. They have different divisions HR (A1), Sales (A2), Production (A3) and Marketing (A4).

The layout of the Delhi branch is:

5



The company also has a branch in Bangalore. The management wants to connect all the divisions as well as all the computers of each division (A1, A2, A3, A4).

Distance between the wings are as follows :

A3 to A1	25 m
A1 to A2	40 m
A2 to A4	25 m
A4 to A3	20 m
A3 to A2	30 m
A1 to A4	170 m
Delhi Head Office to Bangalore Office	2154 km

Number of computers in each of the wing:

A1	50
A2	40
A3	110
A4	60

Based on the above specifications, answer the following questions:

- (i) Suggest the topology and draw the most suitable cable layout for connecting all the divisions of Delhi branch.
- (ii) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting Production (A3) with the Bangalore branch.
- (iii) Which device can be used to connect the network of Delhi Branch to the Internet? This device should be able to receive data, analyse it and then transmit it to the network.
- (iv) Suggest the placement of switch/hub with justification.

- (v) Many employees were finding it difficult to cope up with work pressure and hence were showing stress related symptoms. In order to improve the mental health of its employees, HR planned to conduct an online session with a mental health expert from Mumbai. Out of the options given below, suggest the protocol that will help to send the voice signals over internet to conduct the session successfully.

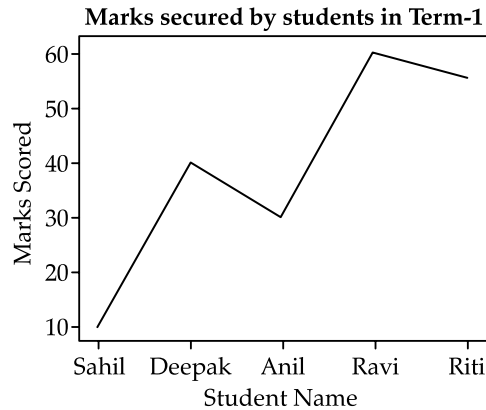
(a) FTP (b) SMTP  
(c) VOIP (d) POP

33. Consider the following graph. Write the Python code to plot it. Also add the Title, label for X and Y axis. 5

Use the following data for plotting the graph

smarks = [10, 40, 30, 60, 55]

sname = ["Sahil", "Deepak", "Anil", "Ravi", "Riti"]



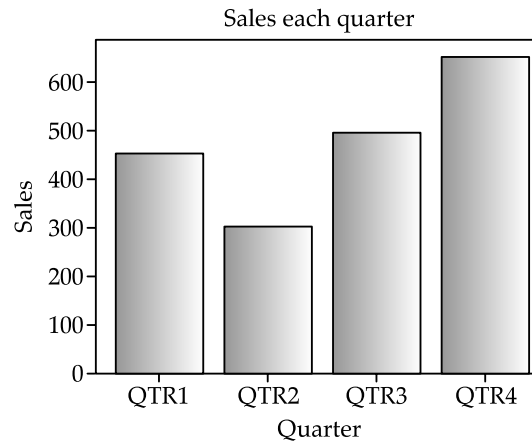
**OR**

- Write Python code to draw the following bar graph representing the total sales in each quarter. Add the Title, Label for X-axis and Y-axis. 5

Use the following data for plotting the graph:

sales = [450, 300, 500, 650]

qtr = ["QTR1", "QTR2", "QTR3", "QTR4"]



## SECTION - E

34. Consider the following table School-data:

1 + 1 + 2

**Table : School-data**

Adm-no	Name	Grade	Club	Marks	Gender
20150001	Sargam Singh	12	STEM	86	Male
20140212	Alok Kumar	10	SPACE	75	Male

20090234	Mohit Gaur	11	SPACE	84	Male
20130216	Romil Malik	10	READER	91	Male
20190227	Tanvi Batra	11	STEM	70	Female
20120200	Nomita Ranjan	12	STEM	64	Female

Write SQL queries for the following:

- (i) Display the average Marks secured by each Gender.
- (ii) Display the minimum Marks secured by the students of Grade 10.
- (iii) Display the total number of students in each Club where number of students are more than 1.

OR

(Option for Part (iii) only)

- (iii) Display the maximum and minimum marks secured by each gender.

2

35. Consider the following Data Frame 'mdf'.

1 + 1 + 2

	ROLL NO	Name	English	Hindi	Maths
0	1	Aditya	23	20	28
1	2	Balwant	18	1	25
2	3	Chirag	27	23	30
3	4	Deepak	11	3	7
4	5	Eva	17	21	24

- (a) Write Python statements for the Data Frame 'mdf':
  - (i) To display the records of the students having roll numbers 2 and 3.
  - (ii) To increase the marks of subject Math by 4, for all students.
- (b) Write Python statement to display the Roll no and Name of all students who secured less than 10 marks in Maths.

OR

(Option for Part B only)

Write Python statement to display the total marks i.e., sum of marks secured in English, Hindi and Maths for all students.

2



# ANSWERS

## PART - A

- Option (a) is correct.**  
*Explanation:* In star topology, every node is connected to a central node.
- Option (d) is correct.**  
*Explanation:* Generally, logos and designs that are used as brand identities for representing businesses are protected as trademarks.
- Option (c) is correct.**  
*Explanation:* Cyber-bullying includes sending, posting, or sharing negative, harmful, false, or demeaning content about someone else.
- Option (a) is correct.**  
*Explanation:* The round() function is used to round off a specified number to a specified decimal places.
- Option (c) is correct.**  
*Explanation:* The multiple row function is also known as the Aggregate functions as they work on multiple records to produce results.
- Option (b) is correct.**  
*Explanation:* The Information Technology Act, 2000 or ITA, 2000 or IT Act, was notified on October 17, 2000. It is the law that deals with cybercrime and electronic commerce in India.
- Option (d) is correct.**  
*Explanation:* The ORDER BY clause sorts the records in ascending or descending order
- Option (c) is correct.**  
*Explanation:* The TRIM function removes the leading and trailing spaces.
- Option (d) is correct.**  
*Explanation:* If a substring is not found in the string, then the INSTR function will return 0.
- Option (c) is correct.**  
*Explanation:* Because indexing of values in a series starts from 0. Even if the elements are 0, indexes are serially given to each data item.
- Option (b) is correct.**  
*Explanation:* Data Frame is a two-dimensional array type data structure in Python where data is stored in rows and columns.
- Option (c) is correct.**  
*Explanation:* A bar graph is used to compare data among categories.
- Option (c) is correct.**  
*Explanation:* Linux is an operating system.
- Option (d) is correct.**  
*Explanation:* LEN( ) function in SQL is used to return the length of a string whereas aggregate functions work on multiple rows in a table.
- Option (b) is correct.**  
*Explanation:* Passive Digital Foot prints are gathered through activities that the user does unintentionally.
- Option (a) is correct.**  
*Explanation:* To prevent the environment, the e-waste should be reused, reduce or recycled.
- Option (b) is correct.**  
*Explanation:* Both (A) and (R) are true and (R) is not the correct explanation for (A).
- Option (c) is correct.**  
*Explanation:* (A) is true and (R) is false.

## PART - B

- A web server is software and hardware that stores the content and uses Hypertext Transfer Protocol and other protocols to deliver the content to the clients over the World Wide Web on request. The main job of a web server is to display website content through storing, processing and delivering web pages to users. Whereas web browsers are softwares that are only used to display the content of websites.

OR

Cookies are small text files that servers pass to a web browser and thereby user's computer, when a user visits a website. Browsers store these messages in small files which are called cookies.

Benefits

- Cookies use less space.
  - Cookies are simple to use and implement and are stored on user's storage device.
  - They save user information thereby saving time.
- Select Sum(Bonus) from employee where zone='WEST';
  - Count():** The count( ) function is used to count the number of rows in a specified column. The count( ) function does not count the NULL values.  
**Count (\*):** The count(\*) functions is used to count all the rows including null values.  
**For example:** The following table has 5 rows including 1 row with null values.

Demo

ID	Name
1	Ajeem
2	NULL
3	Koyal
4	Saira

- ```
Mysql> Select count(Name) from Demo; will return 3, but
Mysql> Select count (*) from Demo ; will return 4
```
- Import pandas as pd  
Capital = ['New Delhi', 'London', 'Copenhagen', 'Bangkok']  
ctry = ['India', 'UK', 'Denmark', 'Bangkok']  
Country = pd.Series(capital, index=ctry)  
Print(country)
  - Plagiarism:** Plagiarism is the copying of someone else's idea or intellectual work and pretending as if it is one's own thought or creativity. For example, copying a part of a text without quotation, paraphrasing a text by changing a few words or modifying the sentence structure without citing the source.

OR

**One must follow the following etiquettes while communicating on social media:**

- Always be polite and respectful while chatting online.
- Always start a chat with a greeting such as 'Hi',



'Good morning' or 'Dear' before the recipient's name'. Close the message with a courteous phrase such as 'Thank you' or 'Regards' followed by your name.

- Do not type everything in capital letters. It is similar to shouting while talking face-to-face. Similarly, do not type everything in lower case letters.

#### 24. Output

```
0 3
1 10
2 3
3 10
```

*Explanation:* 2\*(3,10) relocates the tuple and uses that as the data of the series.

25. (i) `player.index=['player1','player2','player3','player4','player5']`  
 (ii) `player.rename(columns={'points':'netpoint'})`

### PART - C

26. (i) `Select* from patient where month name (date of adm) = 'January';`  
 (ii) `Select count(*) from patient where city = 'delhi';`  
 (iii) `Select right(patient id,2) from patient where department = 'surgery';`
27. `d={'Symbol':pd.Series(['H','He','Li','Be'],['Hydrogen','Helium','Lithium','Beryllium']),'Atomic No':pd.Series([1,2,3,4],['Hydrogen','Helium','Lithium','Beryllium'])}`  
`df=pd.DataFrame(d)`
28. (i) `health.drop(3)`  
 (ii) `health.loc[4]=['malaria','Protozoa']`  
 (iii) `health.iloc[2:]`
29. (i) No  
 (ii) Phishing  
 (iii) he should inform about it to cyber expert and cyber cell and also not to click on the link.

OR

**Hacking:** Hacking is an attempt to exploit a computer system or a private network inside a computer. It is the unauthorized access to or control over computer network security systems for some illicit purpose.

**Measures to avoid being victim of hacking:**

- (a) Use a Firewall  
 (b) Install an anti spyware  
 (c) Ignore spam  
 (d) Keo OS, and browser updated.

30. (i) 6  
 (ii) 34000  
 (iii) Foun  
 Nigh

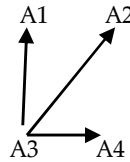
OR

- (i) MATE  
 (ii) ION  
 (iii) 8

### Section - D

31. (i) `select year('2023-05-15');`  
 (ii) `select lower('ABC@XYZ.com');`  
 (iii) `select ltrim('my country');`  
 (iv) `select cur date();`  
 (v) `select pow(10,6);`  
 OR  
 (i) `Select left(item name,3) from product;`  
 (ii) `Select item name from product where day name (stock date) = 'Monday';`  
 (iii) `Select sum(price) from product;`  
 (iv) `Select max(price) from product;`  
 (v) `Select avg(price) from product where company = 'Logitech';`

32. (i) Star topology



- (ii) WAN  
 (iii) Router  
 (iv) switch/hub should be placed in all divisions to connect their computers  
 (v) VoIP
33. `Import matplotlib.pyplot as plt`  
`smarks=[10,20,30,40,50]`  
`sname=['sahil','deepak','anil','ravi','riti']`  
`plt.plot(sname,smarks)`  
`plt.xlabel('Student Name')`  
`plt.ylabel('Marks Scored')`  
`plt.title('Marks secured by students in Term-I')`  
`plt.show()`

OR

`Import matplotlib.pyplot as plt`  
`sales=[450,300,500,650]`  
`qtr=['QTR1','QTR2','QTR3','QTR4']`  
`plt.bar(qtr,sales)`  
`plt.xlabel('quarter')`  
`plt.ylabel('sales')`  
`plt.title('Sales each quarter')`  
`plt.show()`

### SECTION - E

34. (i) `select gender, avg(marks) from school data group by gender;`  
 (ii) `select min(marks) from school data where grade = 10;`  
 (iii) `select club, count(*) from school data group by club having count(*) > 1;`

OR

(iii) `select gender, min(marks), max(marks) from school data group by gender;`

35. (a) (i) `mdf.iloc[1:3]`  
 (ii) `mdf['Maths']=mdf['Maths']+4`  
 (b) `mdf.loc[:,['roll no','name']][mdf['Maths']<10]`

OR

`Print(mdf.English + mdf.Hindi + mdf.Maths)`