Class: XII SESSION : 2022-2023 CBSE SAMPLE QUESTION PAPER (THEORY) SUBJECT: PHYSICS

Maximum Marks: 70 Marks

Time Allowed: 3 hours.

General Instructions:

(1) There are 35 questions in all. All questions are compulsory

(2) This question paper has five sections: Section A, Section B, Section C, Section D and Section E. All the sections are compulsory.

(3) Section A contains eighteen MCQ of 1 mark each, Section B contains seven questions of two marks each, Section C contains five questions of three marks each, section D contains three long questions of five marks each and Section E contains two case study based questions of 4 marks each.

(4) There is no overall choice. However, an internal choice has been provided in section B, C, D and E. You have to attempt only one of the choices in such questions.

5. Use of calculators is not allowed.

SECTION A

Q. NO.		MARKS
1	According to Coulomb's law, which is the correct relation for the following figure?	1
	(i) $q_1 q_2 > 0$ (i) $q_1 q_2 < 0$ (ii) $q_1 q_2 < 0$ (iii) $q_1 q_2 < 0$ (iv) $1 > q_1/q_2 > 0$	
2	The electric potential on the axis of an electric dipole at a distance 'r from it's centre is V. Then the potential at a point at the same distance on its equatorial line will be (i) 2V (ii) -V (iii) V/2 (iv) Zero	1

3	The temperature (T) dependence of resistivity of materials A and material B is represented by fig (i) and fig (ii) respectively. Identify material A and material B.	1
	$ \begin{array}{c} \uparrow \\ \rho \\ \hline \\ T \rightarrow \\ fig. (i) \end{array} $ $ \begin{array}{c} \uparrow \\ \rho \\ \hline \\ T \rightarrow \\ fig. (ii) \end{array} $	
	 (i) material A is copper and material B is germanium (ii) material A is germanium and material B is copper (iii) material A is nichrome and material B is germanium (iv) material A is copper and material B is nichrome 	
4	Two concentric and coplanar circular loops P and Q have their radii in the ratio 2:3. Loop Q carries a current 9 A in the anticlockwise direction. For the magnetic field to be zero at the common centre, loop P must carry (i) 3A in clockwise direction (ii) 9A in clockwise direction (iii) 6 A in anti-clockwise direction (iv) 6 A in the clockwise direction.	1
5	A long straight wire of circular cross section of radius a carries a steady current I. The current is uniformly distributed across its cross section. The ratio of the magnitudes of magnetic field at a point distant a/2 above the surface of wire to that at a point distant a/2 below its surface is (i) 4:1 (ii) 1:1 (iii) 4:3 (iv) 3:4	1
6	If the magnetizing field on a ferromagnetic material is increased, its permeability (i) decreases (ii) increases (iii) remains unchanged (iv) first decreases and then increases	1

7	An iron cored coil is connected in series with an electric bulb with an AC source as shown in figure. When iron piece is taken out of the coil, the brightness of the bulb will	
	(i) decrease	
	(ii) increase	
	(iii) remain unaffected	
	(iv) fluctuate	
8	 Which of the following statement is NOT true about the properties of electromagnetic waves? (I) These waves do not require any material medium for their propagation (ii) Both electric and magnetic field vectors attain the maxima and minima at the same time (iii) The energy in electromagnetic wave is divided equally between electric and magnetic fields (iv) Both electric and magnetic field vectors are parallel to each other 	1
9	A rectangular, a square, a circular and an elliptical loop, all in the $(x-y)$ plane, are moving out of a uniform magnetic field with a constant velocity $\vec{v} = v\hat{\imath}$. The magnetic field is directed along the negative <i>z</i> -axis direction. The induced emf, during the passage of these loops, out of the field region, will not remain constant for (i) any of the four loops (ii) the circular and elliptical loops (iii) the rectangular, circular and elliptical loops (iv) only the elliptical loops	1

10	In a Young's double slit experiment, the path difference at a certain point on the screen between two interfering waves is $\frac{1}{8}$ th of the wavelength. The ratio of intensity at this point to that at the centre of a bright fringe is close to (i) 0.80 (ii) 0.74 (iii) 0.94 (iv) 0.85	1
11	The work function for a metal surface is 4.14 eV. The threshold wavelength for this metal surface is: (i) 4125 Å (ii) 2062.5 Å (iii) 3000 Å (iv) 6000 Å	1
12	The radius of the innermost electron orbit of a hydrogen atom is 5.3×10 ⁻¹¹ m. The radius of the n =3 orbit is (i) 1.01 x 10 ⁻¹⁰ m (ii) 1.59 X 10 ⁻¹⁰ m (iii) 2.12 x 10 ⁻¹⁰ m (iv) 4.77 X 10 ⁻¹⁰ m	1
13	 Which of the following statements about nuclear forces is not true? (i) The nuclear force between two nucleons falls rapidly to zero as their distance is more than a few femtometres. (ii) The nuclear force is much weaker than the Coulomb force. (iii) The force is attractive for distances larger than 0.8 fm and repulsive if they are separated by distances less than 0.8 fm. (iv) The nuclear force between neutron-neutron, proton-neutron and proton-proton is approximately the same. 	1
14	If the reading of the voltmeter V_1 is 40 V, then the reading of voltmeter V_2 is	1



	c) A is true but R is false d) A is false and R is also false			
	ASSERTION(A): The electrical conductivity of a semiconductor increases on doping. REASON: Doping always increases the number of electrons in the semiconductor.			
17	Two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below. a) Both A and R are true and R is the correct explanation of A b) Both A and R are true and R is NOT the correct explanation of A c) A is true but R is false d) A is false and R is also false	1		
	ASSERTION: In an interference pattern observed in Young's double slit experiment, if the separation (d) between coherent sources as well as the distance (D) of the screen from the coherent sources both are reduced to 1/3 rd , then new fringe width remains the same. REASON: Fringe width is proportional to (d/D).			
18	Two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below. a) Both A and R are true and R is the correct explanation of A b Both A and R are true and R is NOT the correct explanation of A c) A is true but R is false d) A is false and R is also false Assertion(A) :	1		
	The photoelectrons produced by a monochromatic light beam incident on a metal surface have a spread in their kinetic energies. Reason(R) :			

The energy of electrons emitted from inside the metal surface, is lost in collision with the other atoms in the metal.

SECTION B

19	 Electromagnetic waves with wavelength (i) λ₁ is suitable for radar systems used in aircraft navigation. (ii) λ₂ is used to kill germs in water purifiers. (iii) λ₃ is used to improve visibility in runways during fog and mist conditions. Identify and name the part of the electromagnetic spectrum to which these radiations belong. Also arrange these wavelengths in ascending order of their magnitude. 		
20	A uniform magnetic field gets modified as shown in figure when two specimens A and B are placed in it. (i)Identify the specimen A and B. (ii) How is the magnetic susceptibility of specimen A different from that of specimen B?	2	
21	What is the nuclear radius of ¹²⁵ Fe ,if that of ²⁷ Al is 3.6 fermi?.	2	
	OR		
	The short wavelength limit for the Lyman series of the hydrogen spectrum is 913.4 A^0 . Calculate the short wavelength limit for the Balmer series of the hydrogen spectrum.		
22	A biconvex lens made of a transparent material of refractive index 1.25 is immersed in water of refractive index 1.33. Will the lens behave as a converging or a diverging lens? Justify your answer.	2	



SECTION C

26	Two long straight parallel conductors carrying currents I_1 and I_2 are separated by a distance d. If the currents are flowing in the same direction, show how the magnetic field produced by one exerts an attractive force on the other. Obtain the expression for this force and hence define 1 ampere.	3
27.	The magnetic field through a circular loop of wire, 12cm in radius and 8.5 Ω resistance, changes with time as shown in the figure. The magnetic field is perpendicular to the plane of the loop. Calculate the current induced in the loop and plot a graph showing induced current as a function of time. $B(T) = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 &$	3
28	An a.c. source generating a voltage $\mathcal{E} = \mathcal{E}_0 \sin \omega t$ is connected to a capacitor of capacitance C. Find the expression for the current I flowing through it. Plot a graph of \mathcal{E} and I versus ωt to show that the current is ahead of the voltage by $\pi/2$. OR An ac voltage $V = V_0 \sin \omega t$ is applied across a pure inductor of inductance <i>L</i> . Find an expression for the current <i>i</i> , flowing in the circuit and show mathematically that the current flowing through it lags behind the applied voltage by a phase angle of $\frac{\pi}{2}$. Also draw graphs of <i>V</i> and <i>i</i> versus ωt for the circuit.	3
29	Radiation of frequency 10 ¹⁵ Hz is incident on three photosensitive surfaces A, B and C. Following observations are recorded: Surface A : no photoemission occurs Surface B : photoemission occurs but the photoelectrons have zero kinetic energy.	3



SECTION D

31	 (a)Draw equipotential surfaces for (i)an electric dipole and (ii) two identical positive charges placed near each other. (b) In a parallel plate capacitor with air between the plates, each plate has an area of 6 x 10⁻³m² and the separation between the plates is 3 mm. (i) Calculate the capacitance of the capacitor. (ii) If the capacitor is connected to 100V supply, what would be the the charge on each plate? (iii) How would charge on the plate be affected if a 3 mm thick mica sheet of k=6 is inserted between the plates while the voltage supply remains connected ?. 	5
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	OR (a)Three charges –q, Q and –q are placed at equal distances on a straight line. If the potential energy of the system of these charges is zero, then what is the ratio Q:q? (b)(i) Obtain the expression for the electric field intensity due to a uniformly charged spherical shell of radius R at a point distant r from the centre of the shell outside it. (ii) Draw a graph showing the variation of electric field intensity E with r, for r > R and r < R.	
32	(a) Explain the term drift velocity of electrons in a conductor .Hence obtain the expression for the current through a conductor in terms of drift velocity. (b) Two cells of emfs E_1 and E_2 and internal resistances r_1 and r_2 respectively are connected in parallel as shown in the figure. Deduce the expression for the (i) equivalent emf of the combination (ii) equivalent internal resistance of the combination (iii) potential difference between the points A and B.	5
	OR	
	 (a) State the two Kirchhoff's rules used in the analysis of electric circuits and explain them. (b) Derive the equation of the balanced state in a Wheatstone bridge using Kirchhoff's laws. 	
33	 a) Draw the graph showing intensity distribution of fringes with phase angle due to diffraction through a single slit. What is the width of the central maximum in comparison to that of a secondary maximum? b) A ray PQ is incident normally on the face AB of a 	5



SECTION E

34	Case Study :				
	Read the following paragraph and answer the questions.				
	A number of optical devices and instruments have been designed and developed such as periscope, binoculars, microscopes and telescopes utilising the reflecting and refracting properties of mirrors, lenses and prisms. Most of them are in common use. Our knowledge about the formation of images by the mirrors and lenses is the basic requirement for understanding the working of these devices.				
	 Why the image formed at infinity is often considered most suitable for viewing. Explain 				
	(ii) In modern microscopes multicomponent lenses are used for both the objective and the eyepiece. Why?				
	 (iii) Write two points of difference between a compound microscope and an astronomical telescope 				
	OR				
	(iii) Write two distinct advantages of a reflecting type telescope over a refracting type telescope.				
35	Case study: Light emitting diode.				
	Read the following paragraph and answer the questions				
	LED is a heavily doped P-N junction which under forward bias emits spontaneous radiation. When it is forward biased, due to recombination of holes and electrons at the junction, energy is released in the form of photons. In the case of Si and Ge diode, the energy released in recombination lies in the infrared region. LEDs that can emit red, yellow, orange, green and blue light are commercially available. The semiconductor used for fabrication of visible LEDs must at least have a band gap of 1.8 eV. The compound semiconductor Gallium Arsenide – Phosphide is used for making LEDs of different colours.				



SAMPLE PAPER (2022-23) CHEMISTRY THEORY (043)

MM:70

General Instructions:

Read the following instructions carefully.

- a) There are **35** questions in this question paper with internal choice.
- b) SECTION A consists of 18 multiple-choice questions carrying 1 mark each.
- c) SECTION B consists of 7 very short answer questions carrying 2 marks each.
- d) SECTION C consists of 5 short answer questions carrying 3 marks each.
- e) SECTION D consists of 2 case- based questions carrying 4 marks each.
- f) SECTION E consists of 3 long answer questions carrying 5 marks each.
- g) All questions are compulsory.
- h) Use of log tables and calculators is not allowed

SECTION A

The following questions are multiple-choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.

- 1. The major product of acid catalysed dehydration of 1-methylcyclohexanol is:
 - a. 1-methylcyclohexane
 - b. 1-methylcyclohexene
 - c. 1-cyclohexylmethanol
 - d. 1-methylenecyclohexane
- 2. Which one of the following compounds is more reactive towards S_N1 reaction?
 - a. CH₂=CHCH₂Br
 - b. C₆H₅CH₂Br
 - c. C₆H₅CH (C₆H₅)Br
 - d. C₆H₅CH(CH₃) Br
- 3. KMnO₄ is coloured due to:
 - a. d-d transitions
 - b. charge transfer from ligand to metal
 - c. unpaired electrons in d orbital of Mn
 - d. charge transfer from metal to ligand

Time: 3 hours

- 4. Which radioactive isotope would have the longer half- life ¹⁵O or ¹⁹O? (Given rate constants for ¹⁵O and ¹⁹O are 5.63x 10^{-3} s⁻¹ and k = 2.38 x 10^{-2} s⁻¹ respectively.)
 - a. ¹⁵O
 - b. ¹⁹O
 - c. Both will have the same half-life
 - d. None of the above, information given is insufficient
- 5. The molar conductivity of CH₃COOH at infinite dilution is 390 Scm²/mol. Using the graph and given information, the molar conductivity of CH₃COOK will be:



*FOR VISUALLY CHALLENGED LEARNERS

- *5. What is the molar conductance at infinite dilution for sodium chloride if the molar conductance at infinite dilution of Na⁺ and Cl⁻ ions are 51.12 × 10⁻⁴ Scm²/mol and 73.54× 10⁻⁴ Scm²/mol respectively?
 - a. 124.66 Scm²/mol
 - b. 22.42 Scm²/mol
 - c. 198.20Scm²/mol
 - d. 175.78 Scm²/mol

- 6. For the reaction, A +2B → AB₂, the order w.r.t. reactant A is 2 and w.r.t. reactant B. What will be change in rate of reaction if the concentration of A is doubled and B is halved?
 - a. increases four times
 - b. decreases four times
 - c. increases two times
 - d. no change

7. Arrange the following in the increasing order of their boiling points:

A : Butanamine, B: N,N-Dimethylethanamine, C: N- Etthylethanaminamine

- a. C<B<A
- b. A<B<C
- c. A<C<B
- d. B<C<A

8. The CFSE of [CoCl₆]³⁻ is 18000 cm⁻¹ the CFSE for [CoCl₄]⁻ will be:

a. 18000 cm⁻¹ b. 8000cm⁻¹ c. 2000 cm⁻¹ d. 16000 cm⁻¹

9. What would be the major product of the following reaction?

 $C_6H_5 - CH_2 - OC_6H_5 + HBr \rightarrow A + B$

- a. $A = C_6H_5CH_2OH$, $B = C_6H_6$ b. $A = C_6H_5CH_2OH$, $B = C_6H_5Br$ c. $A = C_6H_5CH_3$, $B = C_6H_5Br$ d. $A = C_6H_5CH_2Br$, $B = C_6H_5OH$
- 10. Which of the following statements is not correct for amines?
 - a. Most alkyl amines are more basic than ammonia solution.
 - b. pK_b value of ethylamine is lower than benzylamine.
 - c. CH₃NH₂ on reaction with nitrous acid releases NO₂ gas.
 - d. Hinsberg's reagent reacts with secondary amines to form sulphonamides.
- 11. Which of the following tests/ reactions is given by aldehydes as well as ketones?
 - a. Fehling's test
 - b. Tollen's test
 - c. 2,4 DNP test
 - d. Cannizzaro reaction

12. Arrhenius equation can be represented graphically as follows:



The (i) intercept and (ii) slope of the graph are:

a. (i) In A (ii) Ea/R b. (i) A (ii) Ea c. (i)In A (ii) - Ea/R d. (i) A (ii) -Ea

*FOR VISUALLY CHALLENGED LEARNERS

*12. The unit of rate constant for the reaction $2A + 2B \rightarrow A_2B_2$ which has rate = k [A]²[B] is:

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a. mol L<sup>-1</sup>s<sup>-1</sup>
b. s<sup>-1</sup>
c. mol L<sup>-1</sup>
d. mol<sup>-2</sup> L<sup>2</sup> s<sup>-1</sup>
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- 13. The number of ions formed on dissolving one molecule of FeSO₄.(NH₄)₂SO₄.6H₂O in water is:
 - a. 3 b. 4 c. 5 d. 6
- 14. The oxidation of toluene to benzaldehyde by chromyl chloride is called
 - a. Etard reaction
 - b. Riemer-Tiemann reaction
 - c. Stephen's reaction
 - d. Cannizzaro's reaction
- 15. Given below are two statements labelled as Assertion (A) and Reason (R)

Assertion (A): An ether is more volatile than an alcohol of comparable molecular mass.

Reason (R): Ethers are polar in nature.

Select the most appropriate answer from the options given below:

- a. Both A and R are true and R is the correct explanation of A
- b. Both A and R are true but R is not the correct explanation of A.
- c. A is true but R is false.
- d. A is false but R is true.
- 16. Given below are two statements labelled as Assertion (A) and Reason (R)

Assertion (A): Proteins are found to have two different types of secondary structures viz alpha-helix and beta-pleated sheet structure.

Reason (R): The secondary structure of proteins is stabilized by hydrogen bonding.

Select the most appropriate answer from the options given below:

- a. Both A and R are true and R is the correct explanation of A
- b. Both A and R are true but R is not the correct explanation of A.
- c. A is true but R is false.
- d. A is false but R is true.
- 17. Given below are two statements labelled as Assertion (A) and Reason (R)

Assertion : Magnetic moment values of actinides are lesser than the theoretically predicted values.

Reason : Actinide elements are strongly paramagnetic.

Select the most appropriate answer from the options given below:

- a. Both A and R are true and R is the correct explanation of A
- b. Both A and R are true but R is not the correct explanation of A.
- c. A is true but R is false.
- d. A is false but R is true.
- 18. Given below are two statements labelled as Assertion (A) and Reason (R)

Assertion (A): Tertiary amines are more basic than corresponding secondary and primary amines in gaseous state.

Reason (R): Tertiary amines have three alkyl groups which cause +I effect. Select the most appropriate answer from the options given below:

a. Both A and R are true and R is the correct explanation of A

- b. Both A and R are true but R is not the correct explanation of A.
- c. A is true but R is false.
- d. A is false but R is true.

SECTION B

This section contains 7 questions with internal choice in two questions. The following questions are very short answer type and carry 2 marks each.

- 19. A first-order reaction takes 69.3 min for 50% completion. What is the time needed for 80% of the reaction to get completed?(Given: log 5 =0.6990, log 8 = 0.9030, log 2 = 0.3010)
- 20. Account for the following:
 - a. There are 5 OH groups in glucose
 - b. Glucose is a reducing sugar

OR

What happens when D – glucose is treated with the following reagents

- a. Bromine water
- b. HNO3
- 21. Give reason for the following:
 - a. During the electrophilic substitution reaction of haloarenes, para substituted derivative is the major product.
 - b. The product formed during S_N^1 reaction is a racemic mixture.

OR

- a. Name the suitable alcohol and reagent, from which 2-Chloro-2-methyl propane can be prepared.
- b. Out of the Chloromethane and Fluoromethane, which one is has higher dipole moment and why?
- 22. The formula Co(NH₃)₅CO₃Cl could represent a carbonate or a chloride. Write the structures and names of possible isomers.
- 23. Corrosion is an electrochemical phenomenon. The oxygen in moist air reacts as follows:

 $O_2(g) + 2H_2O(I) + 4e^- \rightarrow 4OH^- (aq).$

Write down the possible reactions for corrosion of zinc occurring at anode, cathode, and overall reaction to form a white layer of zinc hydroxide.

- 24. Explain how and why will the rate of reaction for a given reaction be affected when
 - a. a catalyst is added
 - b. the temperature at which the reaction was taking place is decreased
- 25. Write the reaction and IUPAC name of the product formed when 2-Methylpropanal (isobutyraldehyde) is treated with ethyl magnesium bromide followed by hydrolysis.

SECTION C

This section contains 5 questions with internal choice in two questions. The following questions are short answer type and carry 3 marks each.

- 26. Write the equations for the following reaction:
 - a. Salicylic acid is treated with acetic anhydride in the presence of conc. $$\mathsf{H}_2\mathsf{SO}_4$$
 - b. Tert butyl chloride is treated with sodium ethoxide.
 - c. Phenol is treated with chloroform in the presence of NaOH
- 27. Using Valence bond theory, explain the following in relation to the paramagnetic complex [Mn(CN)₆]³⁻
 - a. type of hybridization
 - b. magnetic moment value
 - c. type of complex inner, outer orbital complex
- 28. Answer the following questions:
 - a. State Henry's law and explain why are the tanks used by scuba divers filled with air diluted with helium (11.7% helium, 56.2% nitrogen and 32.1% oxygen)?
 - b. Assume that argon exerts a partial pressure of 6 bar. Calculate the solubility of argon gas in water. (Given Henry's law constant for argon dissolved in water, $K_H = 40$ kbar)
- 29. Give reasons for **any 3** of the following observations:
 - a. Aniline is acetylated before nitration reaction.
 - b. pK_b of aniline is lower than the m-nitroaniline.
 - c. Primary amine on treatment with benzenesulphonyl chloride forms a product which is soluble in NaOH however secondary amine gives product which is insoluble in NaOH.
 - d. Aniline does not react with methyl chloride in the presence of anhydrous AICI₃ catalyst.
- a. Identify the major product formed when 2-cyclohexylchloroethane undergoes a dehydrohalogenation reaction. Name the reagent which is used to carry out the reaction.
 - b. Why are haloalkanes more reactive towards nucleophilic substitution reactions than haloarenes and vinylic halides?

OR

- a. Name the possible alkenes which will yield 1-chloro-1-methylcyclohexane on their reaction with HCI. Write the reactions involved.
- b. Allyl chloride is hydrolysed more readily than n-propyl chloride. Why?

SECTION D

The following questions are case-based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.

31. Strengthening the Foundation: Chargaff Formulates His "Rules"

Many people believe that James Watson and Francis Crick discovered DNA in the 1950s. In reality, this is not the case. Rather, DNA was first identified in the late 1860s by Swiss chemist Friedrich Miescher. Then, in the decades following Miescher's discovery, other scientists--notably, Phoebus Levene and Erwin Chargaff--carried out a series of research efforts that revealed additional details about the DNA molecule, including its primary chemical components and the ways in which they joined with one another. Without the scientific foundation provided by these pioneers, Watson and Crick may never have reached their groundbreaking conclusion of 1953: that the DNA molecule exists in the form of a three-dimensional double helix.

Chargaff, an Austrian biochemist, as his first step in this DNA research, set out to see whether there were any differences in DNA among different species. After developing a new paper chromatography method for separating and identifying small amounts of organic material, Chargaff reached two major conclusions:

(i) the nucleotide composition of DNA varies among species.

(ii) Almost all DNA, no matter what organism or tissue type it comes from maintains certain properties, even as its composition varies. In particular, the amount of adenine (A) is similar to the amount of thymine (T), and the amount of guanine (G) approximates the amount of cytosine (C). In other words, the total amount of purines (A + G) and the total amount of pyrimidines (C + T) are usually nearly equal. This conclusion is now known as "Chargaff's rule."

Chargaff's rule is not obeyed in some viruses. These either have single- stranded DNA or RNA as their genetic material.

Answer the following questions:

- a. A segment of DNA has 100 adenine and 150 cytosine bases. What is the total number of nucleotides present in this segment of DNA?
- b. A sample of hair and blood was found at two sites. Scientists claim that the samples belong to same species. How did the scientists arrive at this conclusion?
- c. The sample of a virus was tested and it was found to contain 20% adenine, 20% thymine, 20 % guanine and the rest cytosine. Is the genetic material of this virus (a) DNA- double helix (b) DNA-single helix (c) RNA? What do you infer from this data?

OR

How can Chargaff's rule be used to infer that the genetic material of an organism is double- helix or single- helix?

32. Henna is investigating the melting point of different salt solutions. She makes a salt solution using 10 mL of water with a known mass of NaCl salt. She puts the salt solution into a freezer and leaves it to freeze. She takes the frozen salt solution out of the freezer and measures the temperature when the frozen salt solution melts. She repeats each experiment.

S.No	Mass of the salt	Melting point in ⁰ C	
	used in g	Readings Set 1	Reading Set 2
1	0.3	-1.9	-1.9
2	0.4	-2.5	-2.6
3	0.5	-3.0	-5.5
4	0.6	-3.8	-3.8
5	0.8	-5.1	-5.0
6	1.0	-6.4	-6.3

Assuming the melting point of pure water as 0°C, answer the following questions:

- a. One temperature in the second set of results does not fit the pattern. Which temperature is that? Justify your answer.
- b. Why did Henna collect two sets of results?
- c. In place of NaCl, if Henna had used glucose, what would have been the melting point of the solution with 0.6 g glucose in it?

OR

What is the predicted melting point if 1.2 g of salt is added to 10 mL of water? Justify your answer.

SECTION E

The following questions are long answer type and carry 5 marks each. Two questions have an internal choice.

33. a. Why does the cell voltage of a mercury cell remain constant during its

lifetime?

- b. Write the reaction occurring at anode and cathode and the products of electrolysis of aq KCI.
- c. What is the pH of HCl solution when the hydrogen gas electrode shows a potential of -0.59 V at standard temperature and pressure?

OR

- a. Molar conductivity of substance "A" is 5.9×10³ S/m and "B" is 1 x 10⁻¹⁶ S/m. Which of the two is most likely to be copper metal and why?
- b. What is the quantity of electricity in Coulombs required to produce 4.8 g of Mg from molten MgCl₂? How much Ca will be produced if the same amount of electricity was passed through molten CaCl₂? (Atomic mass of Mg = 24 u, atomic mass of Ca = 40 u).
- c. What is the standard free energy change for the following reaction at room temperature? Is the reaction spontaneous?

 $Sn(s) + 2Cu^{2+} (aq) a Sn^{2+} (aq) + 2Cu^{+} (s)$

- 34. A hydrocarbon (A) with molecular formula C₅H₁₀ on ozonolysis gives two products (B) and (C). Both (B) and (C) give a yellow precipitate when heated with iodine in presence of NaOH while only (B) give a silver mirror on reaction with Tollen's reagent.
 - a. Identify (A), (B) and (C).
 - b. Write the reaction of B with Tollen's reagent
 - c. Write the equation for iodoform test for C
 - d. Write down the equation for aldol condensation reaction of B and C.

OR

An organic compound (A) with molecular formula $C_2CI_3O_2H$ is obtained when (B) reacts with Red P and Cl₂. The organic compound (B) can be obtained on the reaction of methyl magnesium chloride with dry ice followed by acid hydrolysis.

- a. Identify A and B
- b. Write down the reaction for the formation of A from B. What is this reaction called?
- c. Give any one method by which organic compound B can be prepared from its corresponding acid chloride.
- d. Which will be the more acidic compound (A) or (B)? Why?
- e. Write down the reaction to prepare methane from the compound (B).
- 35. Answer the following:
 - a. Why are all copper halides known except that copper iodide?
 - b. Why is the $E^{o}(V^{3+}/V^{2+})$ value for vanadium comparatively low?
 - c. Why HCl should not be used for potassium permanganate titrations?

- d. Explain the observation, at the end of each period, there is a slight increase in the atomic radius of d block elements.
- e. What is the effect of pH on dichromate ion solution?

Sample Question Paper Class XII Session 2022-23 Mathematics (Code-041)

Time Allowed: 3 Hours

Maximum Marks: 80

General Instructions :

- This Question paper contains five sections A, B, C, D and E. Each section is 1. compulsory. However, there are internal choices in some questions.
- 2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
- 3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
- 4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
- 5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
- 6. Section E has 3 source based/case based/passage based/integrated units of assessment (4 marks each) with sub parts.

SECTION A (Multiple Choice Questions) Each question carries 1 mark

Q1. If A =[a_{ij}] is a skew-symmetric matrix of order n, then (a) $a_{ij} = \frac{1}{a_{ji}} \forall i, j$ (b) $a_{ij} \neq 0 \forall i, j$ (c) $a_{ij} = 0$, where i = j (d) $a_{ij} \neq 0$ where i = jQ2. If A is a square matrix of order 3, |A'| = -3, then |AA'| =(a) 9 (b) -9 (c) 3 (d) -3 Q3. The area of a triangle with vertices A, B, C is given by (a) $|\overrightarrow{AB} \times \overrightarrow{AC}|$ (b) $\frac{1}{2} |\overrightarrow{AB} \times \overrightarrow{AC}|$ (b) $\frac{1}{4} |\overrightarrow{AC} \times \overrightarrow{AB}|$ (d) $\frac{1}{8} |\overrightarrow{AC} \times \overrightarrow{AB}|$ Q4. The value of 'k' for which the function $f(x) =\begin{cases} \frac{1-\cos 4x}{8x^2}, & \text{if } x \neq 0\\ k, & \text{if } x = 0 \end{cases}$ is continuous at x = 0 is (a) 0 (b) -1 (c) 1. Q5. If $f'(x) = x + \frac{1}{x}$, then f(x) is (d) 2(a) $x^2 + \log |x| + C$ (b) $\frac{x^2}{2} + \log |x| + C$ (c) $\frac{x}{2} + \log |x| + C$ (d) $\frac{x}{2} - \log |x| + C$ Q6. If m and n, respectively, are the order and the degree of the differential equation $\frac{d}{dx}\left[\left(\frac{dy}{dx}\right)\right]^4 = 0$, then m + n = (a) 1 (b) 2 (c) 3 (d) 4 Q7. The solution set of the inequality 3x + 5y < 4 is

(a) an open half-plane not containing the origin.

(b) an open half-plane containing the origin.

- (c) the whole XY-plane not containing the line 3x + 5y = 4.
- (d) a closed half plane containing the origin.

- Q8. The scalar projection of the vector $3\hat{i} \hat{j} 2\hat{k}$ on the vector $\hat{i} + 2\hat{j} 3\hat{k}$ is (a) $\frac{7}{\sqrt{14}}$ (b) $\frac{7}{14}$ (c) $\frac{6}{13}$ (d) $\frac{7}{2}$
- Q9. The value of $\int_{2}^{3} \frac{x}{x^{2}+1} dx$ is (a) log4 (b) $log \frac{3}{2}$ (c) $\frac{1}{2} log2$ (d) $log \frac{9}{4}$

Q10. If A, B are non-singular square matrices of the same order, then $(AB^{-1})^{-1} =$ (a) $A^{-1}B$ (b) $A^{-1}B^{-1}$ (c) BA^{-1} (d) AB

Q11. The corner points of the shaded unbounded feasible region of an LPP are (0, 4), (0.6, 1.6) and (3, 0) as shown in the figure. The minimum value of the objective function Z = 4x + 6y occurs at



- Q17. If two vectors \vec{a} and \vec{b} are such that $|\vec{a}| = 2$, $|\vec{b}| = 3$ and $\vec{a} \cdot \vec{b} = 4$, then $|\vec{a} 2\vec{b}|$ is equal to
 - (a) $\sqrt{2}$ (b) $2\sqrt{6}$ (c) 24 (d) $2\sqrt{2}$
- Q18. P is a point on the line joining the points A(0,5,-2) and B(3,-1,2). If the x-coordinate of P is 6, then its z-coordinate is
 - (a) 10 (b) 6 (c) -6 (d) -10

ASSERTION-REASON BASED QUESTIONS

In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

Q19. Assertion (A): The domain of the function $\sec^{-1}2x$ is $\left(-\infty, -\frac{1}{2}\right] \cup \left[\frac{1}{2}, \infty\right)$ Reason (R): $\sec^{-1}(-2) = -\frac{\pi}{4}$

Q20. Assertion (A): The acute angle between the line $\bar{r} = \hat{i} + \hat{j} + 2\hat{k} + \lambda(\hat{i} - \hat{j})$ and the x-axis is $\frac{\pi}{4}$

Reason(R): The acute angle θ between the lines

 $\bar{r} = x_1\hat{\iota} + y_1\hat{j} + z_1\hat{k} + \lambda(a_1\hat{\iota} + b_1\hat{j} + c_1\hat{k}) \text{ and}$ $\bar{r} = x_2\hat{\iota} + y_2\hat{j} + z_2\hat{k} + \mu(a_2\hat{\iota} + b_2\hat{j} + c_2\hat{k}) \text{ is given by } \cos\theta = \frac{|a_1a_2 + b_1b_2 + c_1c_2|}{\sqrt{a_1^2 + b_1^2 + c_1^2}\sqrt{a_2^2 + b_2^2 + c_2^2}}$

SECTION B

This section comprises of very short answer type-questions (VSA) of 2 marks each

Q21. Find the value of $sin^{-1}[sin\left(\frac{13\pi}{7}\right)]$

Prove that the function f is surjective, where
$$f: N \rightarrow N$$
 such that

$$f(n) = \begin{cases} \frac{n+1}{2}, & \text{if } n \text{ is odd} \\ \frac{n}{2}, & \text{if } n \text{ is even} \end{cases}$$

OR

Is the function injective? Justify your answer.

- Q22. A man 1.6 m tall walks at the rate of 0.3 m/sec away from a street light that is 4 m above the ground. At what rate is the tip of his shadow moving? At what rate is his shadow lengthening?
- Q23. If $\vec{a} = \hat{\imath} \hat{\jmath} + 7\hat{k}$ and $\vec{b} = 5\hat{\imath} \hat{\jmath} + \lambda\hat{k}$, then find the value of λ so that the vectors $\vec{a} + \vec{b}$ and $\vec{a} \vec{b}$ are orthogonal.

Find the direction ratio and direction cosines of a line parallel to the line whose equations are

6x - 12 = 3v + 9 = 2z - 2

Q24. If $y\sqrt{1-x^2} + x\sqrt{1-y^2} = 1$, then prove that $\frac{dy}{dx} = -\sqrt{\frac{1-y^2}{1-x^2}}$

Q25. Find $|\vec{x}|$ if $(\vec{x} - \vec{a})$. $(\vec{x} + \vec{a}) = 12$, where \vec{a} is a unit vector.

SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

Q26. Find: $\int \frac{dx}{\sqrt{3-2x-x^2}}$

Q27. Three friends go for coffee. They decide who will pay the bill, by each tossing a coin and then letting the "odd person" pay. There is no odd person if all three tosses produce the same result. If there is no odd person in the first round, they make a second round of tosses and they continue to do so until there is an odd person. What is the probability that exactly three rounds of tosses are made?

OR

Find the mean number of defective items in a sample of two items drawn one-by-one without replacement from an urn containing 6 items, which include 2 defective items. Assume that the items are identical in shape and size.

Q28. Evaluate: $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{tanx}}$

OR

Evaluate: $\int_0^4 |x-1| dx$

Q29. Solve the differential equation: $ydx + (x - y^2)dy = 0$

OR Solve the differential equation: $xdy - ydx = \sqrt{x^2 + y^2} dx$

Q30. Solve the following Linear Programming Problem graphically:

Maximize Z = 400x + 300y subject to $x + y \le 200, x \le 40, x \ge 20, y \ge 0$

Q31. Find $\int \frac{(x^3 + x + 1)}{(x^2 - 1)} dx$

SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

- Q32. Make a rough sketch of the region { $(x, y): 0 \le y \le x^2, 0 \le y \le x, 0 \le x \le 2$ } and find the area of the region using integration.
- Q33. Define the relation R in the set $N \times N$ as follows: For (a, b), (c, d) $\in N \times N$, (a, b) R (c, d) iff ad = bc. Prove that R is an equivalence relation in $N \times N$.

Given a non-empty set X, define the relation R in P(X) as follows: For A, $B \in P(X)$, $(A, B) \in R$ iff $A \subset B$. Prove that R is reflexive, transitive and not symmetric.

Q34. An insect is crawling along the line $\bar{r} = 6\hat{i} + 2\hat{j} + 2\hat{k} + \lambda(\hat{i} - 2\hat{j} + 2\hat{k})$ and another insect is crawling along the line $\bar{r} = -4\hat{i} - \hat{k} + \mu(3\hat{i} - 2\hat{j} - 2\hat{k})$. At what points on the lines should they reach so that the distance between them is the shortest? Find the shortest possible distance between them.

OR

The equations of motion of a rocket are:

x = 2t, y = -4t, z = 4t, where the time t is given in seconds, and the coordinates of a moving point in km. What is the path of the rocket? At what distances will the rocket be from the starting point O(0, 0, 0) and from the following line in 10 seconds? $\vec{r} = 20\hat{i} - 10\hat{j} + 40\hat{k} + \mu(10\hat{i} - 20\hat{j} + 10\hat{k})$

Q35. If A =
$$\begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$$
, find A^{-1} . Use A^{-1} to solve the following system of equations
 $2x - 3y + 5z = 11, 3x + 2y - 4z = -5, x + y - 2z = -3$

SECTION E

(This section comprises of 3 case-study/passage-based questions of 4 marks each with two sub-parts. First two case study questions have three sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively. The third case study question has two sub-parts of 2 marks each.)

Q36. Case-Study 1: Read the following passage and answer the questions given below.



The temperature of a person during an intestinal illness is given by

 $f(x) = -0.1x^2 + mx + 98.6, 0 \le x \le 12$, m being a constant, where f(x) is the temperature in °F at x days.

- (i) Is the function differentiable in the interval (0, 12)? Justify your answer.
- (ii) If 6 is the critical point of the function, then find the value of the constant m.

(iii) Find the intervals in which the function is strictly increasing/strictly decreasing. OR

- Find the points of local maximum/local minimum, if any, in the interval (0, 12) as (iii) well as the points of absolute maximum/absolute minimum in the interval [0, 12]. Also, find the corresponding local maximum/local minimum and the absolute maximum/absolute minimum values of the function.
- Q37. Case-Study 2: Read the following passage and answer the questions given below.



In an elliptical sport field the authority wants to design a rectangular soccer field with the maximum possible area. The sport field is given by the graph of $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$

- (i) If the length and the breadth of the rectangular field be 2x and 2y respectively, then find the area function in terms of x.
- (ii) Find the critical point of the function.
- Use First derivative Test to find the length 2x and width 2y of the soccer field (in (iii) terms of a and b) that maximize its area.

OR

Use Second Derivative Test to find the length 2x and width 2y of the soccer field (iii) (in terms of a and b) that maximize its area.

Q38. Case-Study 3: Read the following passage and answer the questions given below.



There are two antiaircraft guns, named as A and B. The probabilities that the shell fired from them hits an airplane are 0.3 and 0.2 respectively. Both of them fired one shell at an airplane at the same time.

- (i) What is the probability that the shell fired from exactly one of them hit the plane?
- (ii) If it is known that the shell fired from exactly one of them hit the plane, then what is the probability that it was fired from B?

Sample Question Paper <u>CLASS: XII</u> Session: 2022-23 Applied Mathematics (Code-241)

Time Allowed: 3 hrs

Maximum Marks: 80

General Instructions:

- 1. This question paper contains five sections A, B, C, D and E. Each section is compulsory.
- Section A carries 20 marks weightage, Section B carries 10 marks weightage, Section C carries 18 marks weightage, Section - D carries 20 marks weightage and Section - E carries 3 case-based with total weightage of 12 marks.
 - <u>Section A:</u>
- 3. It comprises of 20 MCQs of 1 mark each.
- <u>Section B:</u>
- It comprises of 5 VSA type questions of 2 marks each.
 <u>Section C</u>:
- It comprises of 6 SA type of questions of 3 marks each. Section – D:
- It comprises of 4 LA type of questions of 5 marks each.
 <u>Section E:</u>
- 7. It has **3 case studies**. Each case study comprises of 3 case-based questions, where **2 VSA type questions** are of **1 mark** each and **1 SA type question is of 2 marks**. Internal choice is provided in **2 marks** question in each case-study.
- Internal choice is provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section - D. You have to attempt only one of the alternatives in all such questions.

	<u>SECTION – A</u> (All questions are compulsory. No internal choice is provided in this section)			
1.	What is the least value of 'x' that satisfies $x \equiv 27 \pmod{4}$, when $27 < x \leq 36$?			
	a) 27 b) 30 c) 31 d) 35	1		
2.	Let $p > 0$ and $q < 0$ and $p, q \in Z$, then choose the correct inequality from the given below optionsto complete the statement: $p + q$ a) >b) \leq c) \geq d) <	1		
3.	A machine makes car wheels and in a random sample of 26 wheels, the test statistic is found to be 3.07. As per the t-distribution test (of 5% level of significance), what can you say about the quality of wheels produced by the machine? (Use $t_{25}(0.05) = 2.06$) a) Superior quality b) Inferior quality c) Same quality d) Cannot say	1		

4.	For the purpose of t-test of significance, a random sample of size (n) 34 is drawn from a normal population, then the degree of freedom (v) is -					
	a) $\frac{1}{_{34}}$ b) 33 c) 34 d) 35	1				
5.	A person can row a boat along the stream of the river at 10 km/h and against the stream in 6 km/h. What is the speed of the stream flow?					
	a) 1 km/h b) 2 km/h c) 4 km/h d) 5 km/h	1				
6.	Standard deviation of a sample from a population is called a -					
	a) Standard error b) Parameter c) Statistic d) Central limit	1				
7.	Two water supplying trucks – A and B supply water to remote areas. Truck A is carrying 100 litres of water to a village 1.5 km away and truck B is delivering 80 litres of water to another village, 1 km away. Due to bad road conditions, each truck loses 20 ml water while travelling each metre distance. Which truck is able to deliver more water and by how much more? a) Truck A, 20 litres b) Truck B, 20 litres c) Truck A, 10 litres d) Truck B, 10 litres	1				
8.	What is the face value of a sinking fund that yields a dividend of ₹1800 at 10% semi-annually?					
	a) ₹ 3600 b) ₹18000 c) ₹ 24000 d) ₹ 36000	1				
9.	In the given figure, the area bounded by the curve $x = f(y)$, y -axis and abscissa $y = a$ and $y = b$ is equal to - a) $\int_{a}^{b} f(y) dy$ b) $\int_{a}^{b} f(x) dx$ c) $\int_{a}^{b} f(y) dy$ d) $\int_{a}^{b} f(x) dx$ x = f(y) x = f(y) x = f(y) x = f(y) x = f(y) y = a y =	1				
10.	 A factory production is delayed for three weeks due to breakdown of a machine and unavailability of spare parts. Under which trend oscillation does this situation fall under? a) Seasonal b) Cyclical c) Secular d) Irregular 	1				
11.	A newspaper printing machine costs ₹ 4,80,000 and estimated scrap value of ₹ 25,000 at the end of its useful life of 10 years. What is its annual depreciation as per linear method?	1				
	a) ₹ 4,550					

12.	In the given figure (I), what is the LPP shaded region known as?	1
13.	General solution of differential equation: $y \log y dx - x dy = 0$ is –	
	a) $y = \log Cx $ b) $y = e^{ Cx }$ c) $y = e^{-Cx}$ d) $\log y = C + x $	1
14.	An investment of ₹ 10,000 becomes ₹ 60,000 in 4 years, then the CAGR (compound annual growth rate) is given by -	
	a) $\frac{\sqrt[4]{6}-1}{100}$ b) $\frac{\sqrt[4]{6}+1}{100}$ c) $[\sqrt[4]{6}-1] \times 100$ d) $[\sqrt[4]{6}+1] \times 100$	1
15.	In what ratio shall I add water to the liquid detergent costing ₹ 480 per litre to get resulting mixture worth ₹ 300 per litre?	
	a) 5:3 b) 3:8 c) 3:5 d) 5:8	1
16.	A grain whole-seller visits the granary market. While going around to make a good purchase, he takes a handful of rice from random sacks of rice, in order to inspect the quality of farmers produce. The handful of rice taken from a sack of rice for quality inspection is a: a) statistic b) population c) parameter d) sample	1
17.	For predicting the straight-line trend in the sales of scooters (in thousands) on the basis of 6 consecutive years data, the company makes use of 4-year moving averages method. If the sales of scooters for respective years are <i>a</i> , <i>b</i> , <i>c</i> , <i>d</i> , <i>e</i> and <i>f</i> respectively, then which of the following average will not be computed? a) $\frac{a+b+c+d}{4}$ b) $\frac{b+c+d+e}{4}$ c) $\frac{a+c+d+e}{4}$ d) $\frac{c+d+e+f}{4}$	1
18.	In a school, a random sample of 145 students is taken to check whether a student's average calory intake is 1500 or not. The collected data of average calories intake of sample students is presented in a frequency distribution, which is called a:a) Statisticsb) Samplingc) Parameterd) Population sampling	1

	For questions 19 and 20, two statements are given – one labelled Assertion(A) and the other labelle Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as giver below: (i) Both A and R are true and R is the correct explanation of the assertion	ed 1
	(ii) Both A and R are true but R is not the correct explanation of the assertion	
	(iii) A is true, but R is false (iv) A is false, but R is true	
	1	
19.	Assertion (A): Kuhu and Beena are two equally capable badminton players. Probability that Beena will beat Kuhu in 3 games out of 4 is 25%	
	<u>Reason</u> (R) : The probability of r successes in n trials, denoted by P(X = r) is given by P(X = r) = ${}^{n}C_{r}p^{r}q^{n-r}$, $r = 0, 1,, n$ where p denotes success and q denotes failure in each trial.	1
	a) (i) b) (ii) c) (iii) d) (iv)	
20.	<u>Assertion</u> (A) : If the nominal rate of interest is 12.5% and the inflation is 2%, then the effective rate of interest is 10.5%	
	<u>Reason</u> (R) : If the interest is calculated only at the end of an year, then the effective rate of interest is same as the nominal rate of interest.	1
	a) (i) b) (ii) c) (iii) d) (iv)	
	SECTION – B (All questions are compulsory. In case of internal choice, attempt any one question only)	
21.	₹ 2,50,000 cash is equivalent to a perpetuity of ₹ 7,500 payable at the end of each quarter. What is the rate of interest convertible quarterly?	2
22.	Find value of $2a + 3b - c$, if A = $\begin{bmatrix} 0 & -1 & 28 \\ a - 8 & 0 & 3b \\ -c + 2 & 2 & 0 \end{bmatrix}$ is a skew-symmetric matrix	
	OR	2
	There are two real value(s) of x, for which the value of the determinant $\Delta = \begin{vmatrix} 1 & -2 & 5 \\ 2 & x & -1 \\ 0 & 4 & 2x \end{vmatrix}$ is 86.	Z
	Find the value(s) of x	
23.	A book publisher sells a hard cover edition of a book for ₹ 72 and a paperback edition for ₹ 40. In addition to a fixed weekly cost of ₹ 9,600, the cost of printing hardcover and paperback editions are ₹ 56 and ₹ 28 per book respectively. Each edition requires 5 minutes on the printing machine	2
	whereas hardcover binding takes 10 minutes and paperback takes 2 minutes on the binding machine. The printing machine and the binding machine are available for 80 hours each week. Formulate the linear programming problem to maximise the publisher's profit.	2
24.	A boatman takes half as much time in rowing his boat for a certain distance downstream than upstream. What is the ratio between his speed of rowing the boat in still water and speed of current?	2

r						
	OR					
	In a 200-metre race, Anuj can beat Param by 5 metre or 3 seconds. How much time did Anuj take to complete the race?					
25.	Mitul invested ₹ 3,50,000 in a fund. At the end of the year the value of the fund is ₹ 4,37,500. What is the nominal rate of interest, if the market price is same at the end of the year?	2				
	<u>SECTION – C</u> (All questions are compulsory. In case of internal choice, attempt any one question only)					
26.	Find the interval(s) in which the function $f(x) = \frac{x^4}{4} - 2x^3 + \frac{11x^2}{2} - 6x$, is strictly increasing and strictly decreasing.	3				
27.	Two badminton teams A and B are staying in the same hotel. Team A has 2 male and 3 female players accompanied by 1 coach. Team B comprises of 1 male, 2 female players and 2 coaches. The daily diet requirement (calories and protein) for each person is as given below:CaloriesProteinMale player250065 gFemale player190050 g					
	Coach 2000 54 g Use matrix algebra to calculate the total diet requirement of calories and protein for each team.					
28.	Evaluate $\int \frac{dx}{(1+e^x)(1+e^{-x})}$ OR Evaluate $\int x \log(1+x^2) dx$					
29.	Under the pure market competition scenario, the demand function p_d and the supply function p_s for a certain commodity are given as $p_d = \frac{8}{x+1} - 2$ and $p_s = \frac{x+3}{2}$ respectively, where p is the price and x is the quantity of the commodity. Using integrals, find the producer's surplus. OR The demand function p for maximising a profit monopolist is given by $p = 274 - x^2$ while the marginal cost is $4 + 3x$, for x units of the commodity. Using integrals, find the consumer surplus					
30.	Surjeet purchased a new house, costing ₹ 40,00,000 and made a certain amount of down payment so that he can pay the balance by taking a home loan from XYZ Bank. If his equated monthly instalment is ₹ 30,000, at 9% interest compounded monthly (reducing balance method) and payable for 25 years, then what is the initial down payment made by him? [Use $(1.0075)^{-300} = 0.1062$]					
31.	10 years ago, Mr Mehra set up a sinking fund to save for his daughter's higher studies. At the end of 10 years, he has received an amount of \gtrless 10,21,760. What amount did he put in the sinking fund at the end of every 6 months for the tenure, which paid him 5% p.a. compounded semi-annually? [Use $(1.025)^{20} = 1.6386$]	3				

<u>SECTION – D</u>			
	(All questions are compulsory. In case of internal choice, attempt any one question only)		
22	It is known that 20% of plastic buckets manufactured in a factory are defective. Using the Deisson		
32.	distribution on a sample of 100 buckets, find the probability of		
	(i) Zero defective buckets		
	(ii) At most one bucket is defective		
	$[\text{Use } e^{-3} = 0.049]$		
	OR	5	
	In a math aptitude test, student scores are found to be normally distributed having mean as 45 and standard deviation 5. What percentage of students have scores -		
	(ii) between 30 and 50?		
33.	An event management company charges ₹ 4,800 per guest, for a bulk booking for 100 guests. In addition, it offers a discount of ₹ 200 for each group of 10 guests over and above 100 guest booking. What is the number of guests that will maximise the amount of money the company receives on a booking? What is the maximum profit on such booking?		
	To manufacture 'x' number of dolls, a company's total cost function $C(x)$ is given by $C(x) =$	5	
	$100 + 0.025x^2$ and the total revenue function R (x) is described as R (x) = 5x. Given that C (x) and R (x) are in thousand rupees, what number of dolls shall be manufactured to maximise the profit of the company? What is the maximum profit?		
34.	Rahul is at the whole sale market to purchase folding tables and chairs, to later sell them at his		
	furniture shop. He has only ₹ 5,760 to spend and his van has space to carry at the most 20 items. A		
	table costs him ₹ 360 and a chair costs ₹ 240. Back at his shop, he plans to sell a table at a profit of	5	
	$\stackrel{<}{}$ 22 and a chair at a profit of $\stackrel{<}{}$ 18. Given that he can sell all the items that he purchases, how many		
	tables and chairs shall be purchase in order to maximise his profit?		
35.	The equilibrium conditions for three competitive markets are described as given below, where p_1 , p_2 and p_3 are the equilibrium price for each market respectively.		
	$p_1 + 2p_2 + 3p_3 = 85$		
	$3p_1 + 2p_2 + 2p_3 = 105$	5	
	$2p_1 + 3p_2 + 2p_3 = 110$		
	osing matrix method, and the values of respective equilibrium prices.		
	SECTION – E		
	(All questions are compulsory. In case of internal choice, attempt any one question only)		
36.	<u>CASE STUDY – I</u>		
	An overhead water tank has three pipes A, B and C attached to it (as shown in figure (II)). The inlet pipes A and B can fill the empty tank independently in 15 hours and 12 hours respectively. The outlet pipe C alone can empty a full tank in 20 hours. Based on the above information, answer the following questions. Show steps to support your answers.	pipe B	
1			

2)	For a routine c	eaning of t	natank tha	tank noods	to be emp	tied If nines /	and B are closed at the	
a)	time when the tank is filled to two fifth of its total expensity how long will size C take to empty the						1	
	tank completely?							L T
b)	Lank completely?							
5)	cimultanoously		e empty tai		inpletely, it		ipes ale opened	1
			and Caro o	nonad (in a	rdar) at E a	m ^Q am and C	am racpactively, to fill	
()	the empty ten	, pipes A, b	allu C ale O	ill the tenk	ha fillad ca	mplotoly2	and respectively, to his	
		. III IIOW IIId	any nours w			mpletely		
	C' a sub sub s		C II	C				2
	Given that the	tank is half-	full, only pl	pe C is oper	ied at 6 AIV	i, to empty the	e tank. After closing the	Z
	pipe C and an r	iour's clean	ing time, ta	nk is tilled c	completely	by pipe A and	B together. What is the	
	total time take	n in the wh	ole process	ſ				
27								
57.	CASE STUDY -	<u>11</u>						
	Whon observe	d over a lon	a pariod of	timo atimo	a corios dat	a can prodict t	trond	
	that can foroca	st incrosso	g periou or	unie, a unie or stagnati	ion of a vari	a can predict i iable under	trenu	
	consideration	Stillease Such analyt	ical studios	con bonofit	a husinoss	for forecastin	a or	
	prediction of f	ituro ostima	ated sales o	r production	n n n n n n n n n n n n n n n n n n n	TOT TOTECastin		
	Mathematicall	for findin	g a line of h	est-fit to rei	nresent a tr	rend many m	ethods 1	
	are available.	/ethods like	moving-av و	verages and	least-squar	res squares an	e some	
	of the techniqu	les to predi	ct such tren	ds.	iease squai			
	Mrs. Shamita r	uns a bread	factory and	the record	l of her sale	s of bakery		
	items for the p	eriod of 20	L5 - 2019 is	as follows:		,		
	Year	2015	2016	2017	2018	2019		
	Sales	35	42	46	41	48		
	(in ₹ thousands)						S BAKERY	
	Based on the a	bove inforn	nation, ansv	ver the follo	wing quest	tions. Show		
	steps to suppo	rt your ansv	vers.					
a)	By taking year	2017 as orig	gin, use met	hod of least	t-squares to	o find the best	-fit trend line equation	
	for Mrs. Shami	ta's busines	s. Show the	e steps of yo	our working			
				C	DR			2
	Demonstrate t	he techniqu	e to fit the	best-suited	straight-lin	e trend by the	e method of 3-years	Z
	moving averag	es. Also dra	w the trend	line.				
b)	What are the e	stimated sa	les for Mrs.	Shamita's l	ousiness for	r year 2022?		1
c)	Mrs Shamita w	ishes to gro	w her busir	ness to year	ly sale of ₹	67400. In whi	ch year will she be able	1
	to reach her ta	rget?						
38.	CASE STUDY -	<u> </u>						
	According to a	n education	al board su	rvey, it was	observed tl	hat class XII st	udents apply at least one t	o four
	weeks ahead o	f colleges a	pplication d	eadline. Let	X represer	nt the week w	hen an average student ap	plies
	ahead of a coll	ege's applic	ation deadl	ine and the	probability	of student to	get admission in the colleg	ge
	P(X = x) is given	ven as follov	ws:					

	$P(X = x) = \begin{cases} \frac{kx}{6} & \text{when } x = 0, 1 \text{ or } 2\\ \frac{(1-k)x}{6} & \text{when } x = 3\\ \frac{kx}{2} & \text{when } x = 4\\ 0 & \text{when } x > 4 \end{cases}$ Where k is a real number.	
	based on the above information, answer the following questions. Show steps to support your answer	5.
a)	Find the value of k.	1
b)	What is the probability that Sonali will get admission in the college, given that she applied at least 2 weeks ahead of application deadline?	1
c)	Calculate the mathematical expectation of number of weeks taken by a student to apply ahead of a college's application deadline.	
	OR	
	To promote early admissions, the college is offering scholarships to the students for applying ahead of deadline as follows:	
	₹ 50000 for applying 4 weeks early,	
	₹ 20000 for applying 3 weeks early,	2
	₹ 12000 for applying 2 weeks early,	_
	and ₹ 9600 for applying 1 week early	
	What is the expected scholarship offered by the college?	

Class: XII Session: 2022-23

Computer Science (083)

Sample Question Paper (Theory)

Maximum Marks: 70

Time Allowed: 3 hours

General Instructions:

- 1. This question paper contains five sections, Section A to E.
- 2. All questions are compulsory.
- 3. Section A have 18 questions carrying 01 mark each.
- 4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
- 5. Section C has 05 Short Answer type questions carrying 03 marks each.
- 6. Section D has 03 Long Answer type questions carrying 05 marks each.
- 7. Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
- 8. All programming questions are to be answered using Python Language only.

	SECTION A	
1.	State True or False "Variable declaration is implicit in Python."	1
2.	Which of the following is an invalid datatype in Python? (a) Set (b) None (c)Integer (d)Real	1
3.	<pre>Given the following dictionaries dict_exam={"Exam":"AISSCE", "Year":2023} dict_result={"Total":500, "Pass_Marks":165} Which statement will merge the contents of both dictionaries? a. dict_exam.update(dict_result) b. dict_exam + dict_result c. dict_exam.add(dict_result) d. dict_exam.merge(dict_result)</pre>	1
4.	Consider the given expression: not True and False or True Which of the following will be correct output if the given expression is evaluated? (a) True (b) False (c) NONE (d) NULL	1
5.	Select the correct output of the code: a = "Year 2022 at All the best"	1

-		
	<pre>a = a.split('2') b = a[0] + ". " + a[1] + ". " + a[3] print (b)</pre>	
	(a) Year 0 at All the best	
	(b) Year 0. at All the best	
	(c) Year . 022. at All the best	
	(d) Year . 0. at all the best	
6.	Which of the following mode in file opening statement results or	1
	(a) a+ (b) r+ (c) w+ (d) None of the above	
7.	Fill in the blank:	1
	command is used to remove primary key from the table in SQL.	
	(a)update (b)remove (C)alter (d)drop	
0		4
ð.	which of the following commands will delete the table from MYSQL database?	1
	(a) DELETE TABLE	
	(b) DROP TABLE	
	(c) REMOVE TABLE	
	(d) ALTER TABLE	
9	Which of the following statement(s) would give an error after	1
7.	executing the following code?	
	S="Welcome to class XII" # Statement 1	
	print(S) # Statement 2	
	S="Thank you" # Statement 3	
	S=S+"Thank you" # Statement 5	
	(a) Statement 3	
	(b) Statement 4	
	(c) Statement 5	
	(d) Statement 4 and 5	
10.	Fill in the blank:	1
	is a non-key attribute, whose values are derived from the	
	(a) Primary Key	
	(b) Foreign Key	
	(c) Candidate Key	

	(d) Alternate Key				
11.	The correct syntax of seek() is:	1			
	(a) file_object.seek(offset [, reference_point])				
	(b) seek(offset [, reference_point])				
	<pre>(c) seek(offset, file_object)</pre>				
	(d) seek.file_object(offset)				
12.	Fill in the blank:	1			
	The SELECT statement when combined with clause,				
	returns records without repetition.				
	(a) DESCRIBE				
	(b) UNIQUE				
	(c) DISTINCT				
	(d) NULL				
12					
13.	Fill in the plank:	1			
	and multimedia communications over Internet protocol				
	(a) VoIP (b) SMTP (c) PPP (d)HTTP				
14	What will the following expression be evaluated to in Python?	1			
17.	print $(15.0 / 4 + (8 + 3.0))$	•			
	(a) 14.75 (b)14.0 (c) 15 (d) 15.5				
15	Which function is used to display the total number of records from	1			
	table in a database?	•			
	(a) sum(*)				
	(b) total(*)				
	(c) count(*)				
	(d) return(*)				
16.	To establish a connection between Python and SOL database.	1			
	connect() is used. Which of the following arguments may not				
	necessarily be given while calling connect ()?				
	(a) host				
	(b) database				
	(c) user				
	(d) password				
Q17	and 18 are ASSERTION AND REASONING based questions. Mark the correct	1			
choi	ce as				
(a) Both A and R are true and R is the correct explanation for A				

(b) Both A and R are true and R is not the correct explanation for A					
(C) A 1S True DUT R 1S False (d) A is false but R is True					
C C					
17.	Assertion (A):- If the arguments in function call statement match the number and order of arguments as defined in the function definition, such arguments are called positional arguments. Reasoning (R):- During a function call, the argument list first contains default argument(s) followed by positional argument(s).	1			
18.	Assertion (A): CSV (Comma Separated Values) is a file format for data storage which looks like a text file. Reason (R): The information is organized with one record on each line and each field is separated by comma.	1			
	SECTION B	1			
19.	<pre>Rao has written a code to input a number and check whether it is prime or not. His code is having errors. Rewrite the correct code and underline the corrections made. def prime(): n=int(input("Enter number to check :: ") for i in range (2, n//2): if n%i=0: print("Number is not prime \n") break else: print("Number is prime \n')</pre>	2			
20.	Write two points of difference between Circuit Switching and Packet Switching.	2			
	OR				
	Write two points of difference between XML and HTML.				
21.	(a) Given is a Python string declaration: myexam="@@CBSE Examination 2022@@"	1			
	Write the output of: print (myexam[::-2])				
	<pre>(b) Write the output of the code given below: my_dict = {"name": "Aman", "age": 26} my_dict['age'] = 27 my_dict['address'] = "Delhi" print(my_dict.items())</pre>	1			
22.	Explain the use of 'Foreign Key' in a Relational Database Management System. Give example to support your answer.	2			

23.	(a) Write t (i) SMTP	he full forms: (ii) PPP	of the follo	wing:	2	
	(b) What is	s the use of T	ELNET?			
24.	Predict the	e output of th	e Python co	de given below:	2	
	<pre>def Diff(N1,N2): if N1>N2: return N1-N2 else: return N2-N1</pre>					
	NUM= [10 for CNT A=NU B=NU prin),23,14,54, in range M[CNT] M[CNT-1] ht(Diff(A,E	32] (4,0,-1): 3), '#' , er	nd=' ')		
			OI	2		
	Predict the	e output of th	ne Python co	de given below:		
	<pre>tuple1 = (11, 22, 33, 44, 55, 66) list1 =list(tuple1) new_list = [] for i in list1: if i%2==0: new_list.append(i) new_tuple = tuple(new_list) print(new_tuple)</pre>					
25.	Differentia	ate between o e example.	count() and (count(*) functions in SQL with	2	
		e enampro.				
			UK			
	Categorize the following commands as DDL or DML: INSERT, UPDATE, ALTER, DROP					
			SEC	ΤΙΟΝ C		
26.	(a) Con	sider the foll	owing tables	- Bank_Account and Branch:	1+2	
	Table: Bar	nk_Account				
	ACode	Name	Туре			
	A01	Amrita	Savings			
	A02	Parthodas	Current			
	A03	Miraben	Current			
	-				1	

ACode	City
A01	Delhi
A02	Mumbai
A01	Nagpur

Α	02	Mumbai				
Α	01	Nagpur				
WI SE	nat will	be the output FROM Bank_A	of the fo	llowing sta	N tement? JOIN Branch;	
	(b) Wr TE	ite the output CH_COURSE giv	of the qu en below	eries (i) to ::	(iv) based on t	the table,
		Table	e: TECH_(]
	CID			FEES	STARTDAT	E TID
	C201	Animation an	IO VFX	12000		
	C202			10000	2021-11-13	102
	C203	DDTP		9000	2021-09-15	102
	C205	Mobile Applie	cation	18000	2022-11-01	101
		Development	t			
	C206	Digital marke	eting	16000	2022-07-25	103
Wı 'T	(ii) TE (iii) FEES (iv) FEES rite a m	SELECT T CH_COURSE G SELECT C >15000 ORDE SELECT A BETWEEN 15 Method COUNTL TXT' and disp	ID, COU ROUP BY NAME FR R BY CN VG(FEES 000 AND INES() in lay the li	NT(*), M TID HAV OM TECH_ AME;) FROM T 17000; Python to nes which	IIN (FEES) FF ING COUNT (1 COURSE WHEF ECH_COURSE read lines from	ROM FID) >1; RE WHERE n text file g with any
VO Ex If	wel. ample: the file	content is as f a day keeps the	ollows: e doctor a	away.		
Aı	marked	difference wil	l come in	our count	ry.	

	The number of lines not starting with any vowel - 1											
	OR											
	Write a function ETCount() in Python, which should read each											
	character of a text file "TESTFILE.TXT" and then count and display the count of occurrence of alphabets E and T individually (including small cases e and t too).											
	Example:											
	If the file content is as follows:											
	Today is a pleasant day. It might rain today. It is mentioned on weather sites											
	The ET E or e: T or t	Count() fu 6 : 9	nctior	n should display	y t	the output as:						
28.	(a) Wr relatio	ite the out ons Teacher	puts o ^r and I	f the SQL quer Placement give	rie en	es (i) to (iv) bas below:	ed on th	ie	3			
	Table	• Teacher		5								
	Table	. reacher										
	T_ID	Name	Age	Department		Date_of_join	Salary	Gender				
	1	Arunan	34	Computer Sc		2019-01-10	12000	Μ				
	2	Saman	31	History		2017-03-24	20000	F				
	3	Randeep	32	Mathematics		2020-12-12	30000	Μ				
	4	Samira	35	History		2018-07-01	40000	F				
	5	Raman	42	Mathematics		2021-09-05	25000	Μ				
	6	Shyam	50	History		2019-06-27	30000	Μ				
	7	Shiv	44	Computer Sc		2019-02-25	21000	Μ				
	8	Shalakha	33	Mathematics		2018-07-31	20000	F				
	T . 61.			I								
		: Placemer		L.								
		Depa	unen	L	P A	Adde Adde Adde Adde Adde Adde Adde Adde	_					
	1		y		A		_					
	2	Mathe		25	J	laipur	_					
	3	Comp	uter S			nagpur						
	(i) SELECT Department, avg(salary) FROM Teacher GROUP BY Department;											
	ii)	SELECT M	IAX (D	ate_of_Join	1),	,MIN(Date_o:	f_Join) FROM				
		Teacher;										
	ii) SELECT Name, Salary, T.Department, Place FROM											
		Teacher	Τ, Ρ	lacement P	WI	HERE T.Depa:	rtment	=				
		P.Depart	ment	AND Salary	<u>7>'</u> 2	20000;						
	iv)	SELECT N	lame,	Place FROM	1 1	Teacher T, 1	Placem	ent P				

	WHERE Gender ='F' AND T.Department=P.Department;	
	(b) Write the command to view all tables in a database.	
29.	Write a function INDEX_LIST(L), where L is the list of elements passed as argument to the function. The function returns another list named 'indexList' that stores the indices of all Non-Zero Elements of L.	3
	For example:	
	If L contains [12,4,0,11,0,56]	
	The indexList will have - [0,1,3,5]	
30.	A list contains following record of a customer: [Customer_name, Phone_number, City]	3
	 Write the following user defined functions to perform given operations on the stack named 'status': (i) Push_element() - To Push an object containing name and Phone number of customers who live in Goa to the stack (ii) Pop_element() - To Pop the objects from the stack and display them. Also, display "Stack Empty" when there are no elements in the stack. 	
	For example: If the lists of customer details are:	
	["Gurdas", "99999999999","Goa"] ["Julee", "88888888888","Mumbai"] ["Murugan","7777777777","Cochin"] ["Ashmit", "1010101010","Goa"]	
	The stack should contain ["Ashmit","1010101010"] ["Gurdas","9999999999"]	
	The output should be: ["Ashmit","1010101010"] ["Gurdas","9999999999"] Stack Empty	
	OR	
	Write a function in Python, Push(SItem) where , SItem is a dictionary containing the details of stationary items- {Sname:price}. The function should push the names of those items in the stack who have price greater than 75. Also display the count of elements pushed into the stack. For example: If the dictionary contains the following data:	

	Ditem={"Pen":106,"Pencil":59,"Notebook":80,"Eraser":25}									
	The stack should contain									
	Notebook									
	Pen									
	The output should be:									
	The count of elements in the stack	k is 2								
	SE									
31.	MakeInIndia Corporation, an Utta	rakhand based	IT training	company,						
	is planning to set up training cent	res in various c	ities in next	t 2 years.						
	Their first campus is coming up	o in Kashipur (district. At	Kashipur						
	campus, they are planning to	have 3 differ	ent <u>b</u> locks	for App						
	development, Web designing ar	nd Movie editi	ng. Each t	block has						
	number of computers, which are notwork for computers	re required to	be connec	ted in a						
	consultant of this company you	have to sugge	ital ilig. As a st the hest	network						
	related solutions for them for issu	les/problems ra	ised in que	stion nos.						
	(i) to (v), keeping in mind	the distance	s between	various						
	blocks/locations and other given p	arameters.								
		КУСНІВІ								
		APP CAMPU	S HOWE							
	DEV	ELOPM	EDITING	/						
		WER								
		DESIGNIN	١G							
	Distance between various blocks/locat	ions								
	Distance between various blocks/locat	10113.								
	Block		Distance							
	App development to Web des	igning	28 m							
	App development to Movie ec	liting	55 m							
	Web designing to Movie editir	ng	32 m							
	Kashipur Campus to Mussoorie	e Campus	232 km							
	Number of computers									
	Block	Number of Con	nputers							
	App development	75								
	Web designing	50								
	Movie editing	80								
	(i) Suggest the most appropriat	to block /locatio	n to house t	ho						
	SFRVFR in the Kashinur cam	inus (out of the	3 hlocks) to	oet the	1					
	best and effective connecti	vity. Justify you	r answer.	Secure						
	(ii) Suggest a device/software to	o be installed in	the Kashipi	Jr						
	Campus to take care of data se	ecurity.	· · · · · · · · · · · · · · · · · · ·		1					
	(iii) Suggest the best wired mediu	um and draw the	e cable layo	ut (Block	1					
1										

	to Block) to economically connect various blocks within the	
	Kashipur Campus.	1
	(1V) Suggest the placement of the following devices with appropriate	
	a. Switch / Hub	
	b. Repeater	
	(v) Suggest a protocol that shall be needed to provide Video	1
	Conferencing solution between Kashipur Campus and Mussoorie	
	Campus.	
32.	(a) Write the output of the code given below:	2+3
	def sum $(q, r=2)$:	
	global p	
	p=r+q**2	
	print(p, end= '#')	
	a=10	
	b=5	
	sum(a, b) sum(r=5, g=1)	
	(b) The code given below inserts the following record in the table Student:	
	RollNo - integer	
	Name - string	
	Clas - integer	
	Marks - integer	
	Note the following to establish connectivity between Python and	
	Username is root	
	Password is tiger	
	• The table exists in a MYSQL database named school.	
	• The details (RollNo, Name, Clas and Marks) are to	
	be accepted from the user.	
	Write the following missing statements to complete the code:	
	Statement 2 - to execute the command that inserts the record in the	
	table Student.	
	Statement 3- to add the record permanently in the database	
	import mysql.connector as mysql def sql data():	
	con1=mysql.connect(host="localhost",user="root",	
i		1

password="tiger", database="school") **#**Statement 1 mycursor= rno=int(input("Enter Roll Number :: ")) name=input("Enter name :: ") clas=int(input("Enter class :: ")) marks=int(input("Enter Marks :: ")) querry="insert into student values({},'{}',{}',{})".format(rno,name,clas,marks) **#Statement 2** # Statement 3 print("Data Added successfully") OR (a) Predict the output of the code given below: s="welcome2cs" n = len(s)m=""" for i in range (0, n): if $(s[i] \ge 'a' \text{ and } s[i] \le 'm')$: m = m + s[i].upper()elif (s[i] >= 'n' and s[i] <= 'z'): m = m + s[i-1]elif (s[i].isupper()): m = m + s[i].lower()else: m = m + ' & 'print(m) (b) The code given below reads the following record from the table named student and displays only those records who have marks greater than 75: RollNo - integer Name - string Clas - integer Marks - integer Note the following to establish connectivity between Python and **MYSQL:** Username is root Password is tiger • The table exists in a MYSQL database named school. Write the following missing statements to complete the code: Statement 1 - to form the cursor object Statement 2 - to execute the query that extracts records of those students whose marks are greater than 75. Statement 3- to read the complete result of the query (records whose

	marks are table stu	e greater th udent in th	nan 75 ne dat) into abase.	the o	oject named	data, from the				
	import def sql	mysql.co _data():	nnect	tor a	s my	sql					
	cc pa myc pri	on1=mysql assword=" cursor= .nt("Stud	.con tige: ents	nect(r", d with	host atab mar	="localhos ase="schoo ks greater	st",user="root", ol") #Statement 1 than 75 are :				
	<pre>data= #Statement 2 data= #Statement 3 for i in data: print(i) print()</pre>										
33.	What is the advantage of using a csv file for permanent storage? Write a Program in Python that defines and calls the following user defined functions:										
	 (i) ADD() - To accept and add data of an employee to a CSV file 'record.csv'. Each record consists of a list with field elements as empid, name and mobile to store employee id, employee name and employee salary respectively. (ii) COUNTR() - To count the number of records present in the CSV file named 'record.csv'. OR 										
	Give any one point of difference between a binary file and a csv file. Write a Program in Python that defines and calls the following user defined functions:										
	 (i) add() - To accept and add data of an employee to a CSV file 'furdata.csv'. Each record consists of a list with field elements as fid, fname and fprice to store furniture id, furniture name and furniture price respectively. (ii) search()- To display the records of the furniture whose price is more than 10000. 										
24	Marrida a		4 - h l -		SECTI			4.4.2			
34.	Navdee the ma division student	p creates a rks securec . After cre s in the tab	table by s ation le.	e RESU studen of th	LI wi ts in le tab	th a set of i Sem 1, Sem ble, he has	records to maintain 12, Sem3 and their entered data of 7	1+1+2			
	ROLL_NO	SNAME	SEM1	SEM2	SEM3	DIVISION					
	101	KARAN	366	410	402	I					
	102	NAMAN	300	350	325	I					

	103	ISHA	400	410	415	l				
	104	RENU	350	357	415	I				
	105	ARPIT	100	75	178	IV				
	106	SABINA	100	205	217	II				
	107	NEELAM	470	450	471	I				
	 Based on the data given above answer the following questions: (i) Identify the most appropriate column, which can be considered as Primary key. (ii) If two columns are added and 2 rows are deleted from the table result, what will be the new degree and cardinality of the above table? (iii) Write the statements to: a. Insert the following record into the table Roll No- 108, Name- Aadit, Sem1- 470, Sem2-444, Sem3-475, Div - I. b. Increase the SEM2 marks of the students by 3% whose name begins with 'N'. 									
	 (iii) Write the statements to: a. Delete the record of students securing IV division. b. Add a column REMARKS in the table with datatype as varchar with 50 characters 									
35.	Aman is a Python programmer. He has written a code and created a binary file record.dat with employeeid, ename and salary. The file contains 10 records. He now has to update a record based on the employee id entered by the user and update the salary. The updated record is then to be written in the file temp.dat. The records which are not to be updated also have to be written to the file temp.dat. If the employee id is not found, an appropriate message should to be displayed. As a Python expert, help him to complete the following code based on the requirement given above:									
	<pre>import def upd rec= fin= fout fout eid=</pre>	date_data ={} =open("rea =open("	(): cord. 	dat"	,"rb " empl:	")) oyee id to	#Statement 1 #Statement 2 o update their			

salary :: ")) while True: try: #Statement 3 rec= if rec["Employee id"]==eid: found=True rec["Salary"]=int(input("Enter new salary :: ")) #Statement 4 pickle. else: pickle.dump(rec, fout) except: break if found==True: print("The salary of employee id ",eid," has been updated.") else: print("No employee with such id is not found") fin.close() fout.close() 1 Which module should be imported in the program? (Statement (i) 1 1) Write the correct statement required to open a temporary file (ii) named temp.dat. (Statement 2) 2 Which statement should Aman fill in Statement 3 to read the (iii) data from the binary file, record.dat and in Statement 4 to write the updated data in the file, temp.dat?