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12th Science
Board Papers - July 2019

1. Physics

2. Chemistry

3. Biology

4. Maths

BOARD QUESTION PAPER : JULY 2019

PHYSICS

Time: 3 Hours

Total Marks: 70

Note:

- i. All questions are compulsory.
- ii. Draw neat, labelled diagrams wherever necessary.
- iii. Question paper consists of **29** questions divided into **FOUR** sections namely **A, B, C** and **D**.
- iv. **Section A:** Select and write the most appropriate answer from the given alternative for Q. No.1 to 4 of **multiple choice** type questions carrying **one mark** each and Q.No.5 to 8 are **very short answer** type of questions carrying **one mark** each.
- v. **Section B:** contains Q. No. 9 to 15 of **short answer-I** type questions carrying **two marks** each. Internal choice is provided to **only one** question.
- vi. **Section C:** contains Q. No. 16 to 26 of **short answer-II** type of questions carrying **three marks** each. Internal choice is provided to **only one** question.
- vii. **Section D:** contains Q. No. 27 to 29 of **long answer** type of questions carrying **five marks** each. Internal choice is provided to **each** question.
- viii. For each **MCQ**, correct answer must be written along with its alphabet, e.g., (A) / (B) / (C) / (D) etc.
- ix. In case of **MCQs**, (i.e. Q. No. 1 to 4) evaluation would be done for the **first attempt** only.
- x. Start each section on new page.
- xi. Figures to the right indicate full marks.
- xii. Use logarithmic table, if necessary. Use of calculator is **not** allowed.
- xiii. Write proper units wherever necessary as per standard rules.

Physical Constants:

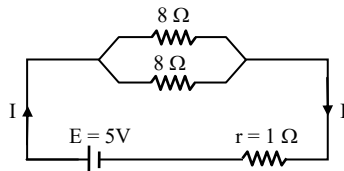
- (1) Acceleration due to gravity, $g = 9.8 \text{ m/s}^2$
- (2) Rydberg's constant, $R = 1.093 \times 10^7 \text{ m}^{-1}$

SECTION A

[8]

- Q.1** If the kinetic energy of hydrogen is 151.91 J at the pressure of 1 atmosphere, then its volume is (1)
- (A) 3 litre (B) 2 litre
(C) 1 litre (D) 0.5 litre
- Q.2** A wavelength in the middle of visible spectrum will be shifted towards red when the source and the observer move away from each other. This is due to (1)
- (A) interference of light (B) dispersion of light
(C) polarisation of light (D) Doppler effect in light
- Q.3** If the longitudinal wave travelling in rarer medium is incident on the boundary of denser medium, then the phase of wave changes by (1)
- (A) 2π rad (B) π rad
(C) $\frac{\pi}{2}$ rad (D) $\frac{\pi}{4}$ rad
- Q.4** In a step-up transformer, ratio of the turns is (1)
- (A) greater than 1 (B) less than 1
(C) equal to 1 (D) never equal to 1
- Q.5** What happens if the rod of dia-magnetic material is placed in a nonuniform magnetic field? (1)

Q.6 Find the total current 'I' flowing through the following circuit:



(1)

Q.7 What is the expression for minimum angular momentum of electron in hydrogen atom?

(1)

Q.8 A rod of length 4 cm is movable on a rectangular frame of wire. A film is formed in the frame. A force of 3.2×10^{-3} N is applied to the rod for its equilibrium. Find the surface tension of the liquid.

(1)

SECTION B

[14]

Q.9 A coil has 'n' turns, each of cross-sectional area 1.6 cm^2 . The axis of the coil is kept inclined at 30° with the direction of uniform magnetic field of induction 2 N/Am. The torque of 0.02 Nm is experienced by the coil, when a current of 1.25 A flows through each turn. Calculate n.

OR

The susceptibility of magnesium at 300 K is 1.2×10^{-5} . At what temperature the susceptibility will decrease by 0.4×10^{-5} ?

(2)

Q.10 State Kirchoff's second law for a closed circuit. How will you minimize the errors in Kelvin's method?

(2)

Q.11 Define U.C.M.

Name the forces acting on a body executing nonuniform circular motion.

(2)

Q.12 Explain the principle of conservation of angular momentum with the help of two appropriate examples.

(2)

Q.13 Define bandwidth of signal and frequency modulation.

(2)

Q.14 Define epoch of S.H.M. State the factors on which the total energy of a particle performing S.H.M. depends.

(2)

Q.15 A driver in a stationary bus blows horn with frequency 1024 Hz. Another bus directly behind the stationary bus is approaching it at the speed of 54 km/hr. Find the frequency of sound heard by the driver in the moving bus.

[Speed of sound in air is 340 m/s.]

(2)

SECTION C

[33]

Q.16 Obtain an expression for average power dissipated in series LCR A.C. circuit. Hence obtain an expression for power factor of the circuit.

(3)

Q.17 When does the p-n junction diode act as a closed switch and as an open switch? State any four advantages of semiconductor devices.

(3)

Q.18 Calculate the wavelength of H_γ line and series limit for Brackett series.

(3)

Q.19 On the basis of molecular theory explain the phenomenon of surface tension.

(3)

Q.20 Describe an experiment for the study of characteristics of photoelectric effect.

(3)

Q.21 Define the term 'damped oscillations'.

A body of mass 1 kg is made to oscillate on a spring of force constant 25×10^3 dyne/cm. Calculate the magnitude of angular velocity and frequency of vibrations of the body.

(3)

Q.22 State Ampere's circuital law.

Using Ampere's circuital law, obtain an expression for magnetic induction at any point due to a straight conductor carrying current.

(3)

- Q.23** Obtain an expression for energy of a charged capacitor and express it in different forms. (3)
- Q.24** State the principle of superposition of waves.
Distinguish between forced vibrations and resonance. (3)
- Q.25** State and prove the Kirchoff's law of radiation theoretically.

OR

State Boyle's law.

On the basis of kinetic theory of gases, obtain an expression for kinetic energy per unit volume of gas. (3)

- Q.26** In Melde's experiments, when a tuning fork is arranged in perpendicular position and a wire is stretched by an empty pan, 6 loops are obtained. When 1 gram of weight is added to the pan, number of loops becomes 4. Find the mass of pan.
Without disturbing the experimental setup, the position of the fork is changed to parallel position, how many loops will be formed with and without mass in pan? (3)

SECTION D

[15]

- Q.27** A. Obtain an expression for binding energy of a satellite revolving around the earth close to its surface. (3)
- B. A car rounds a curve of radius 625 m with a speed of 45 m/s. What is the minimum value of coefficient of friction which prevents the car from sliding? (2)

OR

- A. Discuss the variation of acceleration due to gravity with latitude. (3)
- B. Find the frequency of revolution of a round disco stage revolving with an angular speed of 300 degree/second. (2)

- Q.28** A. Explain the behaviour of a metal wire under increasing load. (3)
- B. Find the radius of gyration of a rod of length 3 m about its transverse axis passing through its one end. (2)

OR

- A. Describe an experiment to determine Young's modulus of the material of wire. (3)
- B. The M.I. of solid sphere about an axis passing through its centre is 2 kg-m^2 . Calculate its M.I. about a tangent passing through any point on its surface. (2)

- Q.29** A. Explain Rayleigh's criterion for the resolution of two close point objects, when their images are
i. just resolved, ii. well resolved and iii. unresolved. (3)
- B. A parallel beam of monochromatic light is incident on a glass slab at an angle of incidence 30° , gets refracted through an angle of $19^\circ 28'$. Find the ratio of width of parallel beam in air to that in glass. (2)

OR

- A. Give the analytical treatment for interference bands. Hence obtain an expression for path difference between the interfering waves. (3)
- B. Find the polarising angle for the material of refractive index $\frac{9}{5}$. (2)



BOARD QUESTION PAPER : JULY 2019

CHEMISTRY

Time: 3 Hours

Total Marks: 70

Notes:

- i. All questions are compulsory.
- ii. Draw neat, labelled diagrams and write balanced chemical equations wherever necessary.
- iii. Question paper consists of **29** questions divided into **FOUR** sections, namely **A, B, C** and **D**.
- iv. **Section A:** Select and write the most appropriate answer from the given alternatives for Q. No **1** to **4** of **multiple choice** type questions carrying **one mark** each. Q. No **5** to **8** are **very short answer** type questions carrying **one mark** each.
- v. **Section B** contains Q. No. **9** to **15** of **short answer-I** type questions carrying **two marks** each. Internal choice is provided to **only one** question.
- vi. **Section C** contains Q. No. **16** to **26** of **short answer-II** type questions carrying **three marks** each. Internal choice is provided to **only one** question.
- vii. **Section D** contains Q. No. **27** to **29** of **long answer** type questions carrying **five marks** each. Internal choice is provided to **each** question.
- viii. For **each MCQs**, correct answer must be written along with its alphabet, **e.g., (A) / (B) / (C) / (D) etc.**
- ix. In case of **MCQs**, (i.e. Q. No. **1** to **4**), evaluation would be done for the first attempt only.
- x. Start each section on new page.
- xi. Figures to the right indicate full marks.
- xii. Use log table if necessary. Use of calculator is **not** allowed.

Given:

$$R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1},$$

Atomic weights: H = 1, C = 12, N = 14, O = 16, Cl = 35.

SECTION A

- Q.1** The molecular formula of Galena is _____. (1) [8]
 (A) PbS (B) Cu₂S
 (C) ZnS (D) FeS₂
- Q.2** The hormone which maintains sugar level in human blood is _____. (1)
 (A) Thyroxine (B) Adrenaline
 (C) Insulin (D) Androgen
- Q.3** 1 gram NaOH is dissolved in $\frac{1}{4}$ dm³ of water. The molarity of solution is _____. (1)
 (A) 0.001 M (B) 0.01 M
 (C) 0.1 M (D) 1 M
- Q.4** Non narcotic analgesic is _____. (1)
 (A) Aspirin (B) Codeine
 (C) Heroin (D) Morphine
- Q.5** Write IUPAC name of [Pt(en)₂Cl₂]²⁺ complex ion. (1)
- Q.6** Conversion of carbon into carbon dioxide can not perform the work. Give reason. (1)

- Q.7 Write the name of an inert gas element used in the treatment of cancer by radiotherapy. (1)
- Q.8 Give the relation between radius of atom and edge length in body centered cubic crystal. (1)

SECTION B

- Q.9 Explain linkage isomerism. (2) [14]
- Q.10 Define the following terms:
- i. Soap (2)
- ii. Antifertility drugs (2)
- Q.11 Prepare nitrogen gas by using the following compound:
- i. NH_4Cl (2)
- ii. CaOCl_2 (2)

OR

Write chemical reaction that takes place in preparing Holme's signal.

- Q.12 Explain Bessemerization process. (2)
- Q.13 Distinguish between Lanthanoids and Actinoids. (2)
- Q.14 The molar conductivity of 0.02M HCl solution is $407.2 \Omega^{-1} \text{ cm}^2 \text{ mol}^{-1}$ at 25°C . Calculate its conductivity. (2)
- Q.15 Write the reactions for the preparation of polymer by using the following monomers:
- (i) Vinyl chloride (2)
- (ii) Tetrafluoroethene (2)

SECTION C

- Q.16 Explain the role of iodic acid in the preparation of ethyl iodide from ethane. Dilactic acid is optically inactive. Why? (3) [33]
- Q.17 Define osmotic pressure.
Write mathematical expression between cryoscopic constant and molar mass of solute.
To convert Cu^{2+} to Cu, what quantity of Faradays of electricity is required? (3)
- Q.18 PH_3 has low boiling point than NH_3 . Why?
Complete the following reaction: $\text{Sn} \xrightarrow[\Delta]{\text{PCl}_5}$ (3)
- Q.19 The half life of first order reaction is 6.0 hours. How long it will take for the concentration of reactant to decrease from 0.8 M to 0.25 M. (3)

OR

For a certain second order reaction energy of activation is 240 kJ mol^{-1} . Calculate its rate constant at 1023 K if the rate constant at 923 K is $0.0113 \text{ M}^{-1}\text{S}^{-1}$.
($R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$).

- Q.20 Give IUPAC name of $(\text{CH}_3)_3\text{C} - \overset{\text{OH}}{\text{CH}} - \text{C}_2\text{H}_5$
Convert the following:
- i. Ethanal into ethanal cyanohydrin. (3)
- ii. 3,5-dinitrobenzoic acid into 3,5-dinitrobenzoyl chloride. (3)

- Q.21 Write the following conversions:
- i. Acetaldoxime into ethyl amine (3)
- ii. Ethoxyethane into ethanol
- iii. Carboic acid into p-phenol sulphonic acid (3)

Q.22 Classify the following solids:

- | | |
|------------------------------|-----------|
| i. Diamond | ii. NaCl |
| iii. P ₄ molecule | iv. Brass |

What is Schottky defect?

(3)

Q.23 Define enzyme.

Amines are basic in nature. Explain.

(3)

Q.24 How are the following conversions carried out ?

- | | |
|--------------------------------|----------------------------|
| (i) Dry ice into ethanoic acid | (ii) Glucose into n-hexane |
| (iii) Glucose into glucoxime ? | |

(3)

Q.25 Write a note on lanthanoid contraction.

Write two uses of KMnO₄.

(3)

Q.26 Define the term enthalpy.

Classify the following properties into intensive and extensive properties :

- | | | | |
|--------------|--------------|------------|-----------|
| (i) Pressure | (ii) Density | (iii) Work | (iv) Heat |
|--------------|--------------|------------|-----------|

(3)

SECTION D

Q.27 Derive $\pi = CRT$

Draw neat, labelled diagram of H₂ – O₂ fuel cell.

Define homopolymer.

[15]

OR

Define the following terms :

- | | |
|--------------|--------------------|
| (i) Molality | (ii) Mole fraction |
|--------------|--------------------|

Draw neat, labelled diagram of standard hydrogen electrode.

Define condensation polymer.

Q.28 Convert benzene diazonium halide into aryl iodide.

The layer of ozone acts as a protective umbrella. Explain.

Write aldol condensation reaction between ethanal and propanal.

OR

What is the action of benzene sulphonyl chloride on ethanamine. Explain bleaching action of chlorine. Write a note on Fischer esterification.

Q.29 Define elementary reaction.

Write conversion of 2-bromobutane into unsaturated hydrocarbon by using alcoholic KOH.

Calculate work done by the following chemical reaction:



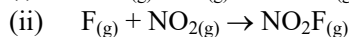
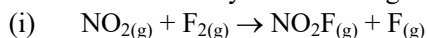
State whether work is done on the system or by the system.

Give two uses of ethanol.

(5)

OR

A reaction occurs by the following mechanism:



Identify the intermediate and write net reaction.

Write the reaction for preparation of Grignard's reagent.

Determine whether the following reaction is exothermic or endothermic and spontaneous or non-spontaneous for the given data : $\Delta H = -110\text{kJ}$ and $\Delta S = +40\text{Jk}^{-1}$ at 400 K.

Write IUPAC name of pyrogallol.

BOARD QUESTION PAPER : JULY 2019

MATHEMATICS AND STATISTICS

Time: 3 Hours

Total Marks: 80

Note:

- i. All questions are compulsory.
- ii. Figures to the right indicate full marks.
- iii. The question paper consists of 30 questions divided into **FOUR** sections **A, B, C, D**.
- iv.
 - **Section A** contains 6 multiple choice questions (MCQ) of 1 mark each.
 - **Section B** contains 8 questions of 2 marks each. (One of them has internal option)
 - **Section C** contains 6 questions of 3 marks each. (Two of them have internal options)
 - **Section D** contains 10 questions of 4 marks each. (Three of them have internal options)
- v. For each MCQ, correct answer must be written along with its **alphabet**, e.g., (A) / (B) / (C) / (D) etc. In case of MCQs, (Q. No. 1 to 6) evaluation would be done for the first attempt only.
- vi. Start answers of each section on new page only.
- vii. Use of logarithmic table is allowed.
- viii. Use of calculator is **not** allowed.
- ix. In L.P.P. only rough sketch of graph is expected. Graph paper is **not** necessary.

SECTION A

Select and write the most appropriate answer from the given alternatives for each question: [6]

1. The polar co-ordinates of a point whose cartesian co-ordinates are $\left(-\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ are _____. (1)

(A) $\left(1, \frac{\pi^c}{4}\right)$	(B) $\left(1, \frac{5\pi^c}{4}\right)$
(C) $\left(\sqrt{2}, \frac{\pi^c}{4}\right)$	(D) $\left(\sqrt{2}, 200^\circ\right)$
2. If a line makes angles α, β, γ with co-ordinate axes, then $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma =$ _____. (1)

(A) 1	(B) -1
(C) 2	(D) -2
3. If the point A($\lambda, 5, -2$) lies on the line $\frac{x+1}{7} = \frac{y+1}{-6} = \frac{z+1}{1}$, then the value of λ is _____. (1)

(A) -1	(B) 1
(C) 8	(D) -8
4. The function $f(x)$ is continuous at the point $x = 0$, where $f(x) = \frac{\log(1+kx)}{\sin x}$, for $x \neq 0$
 $= 5$, for $x = 0$
 then value of k is _____. (1)

(A) -5	(B) 5
(C) 2	(D) -2
5. $\int \frac{(x+3)}{(x+4)^2} \cdot e^x dx$ is equal to _____. (1)

(A) $\frac{1}{(x+4)^2} + c$	(B) $\frac{e^x}{(x+4)^2} + c$
(C) $\frac{e^x}{x+4} + c$	(D) $\frac{e^x}{x+3} + c$

6. The differential equation whose general solution is $y = \log x + c$ is _____ (1)
- (A) $x \cdot \frac{dy}{dx} = 1$ (B) $x \cdot \frac{dy}{dx} + 1 = 0$
- (C) $\frac{dy}{dx} + x = 0$ (D) $\frac{1}{x} \cdot \frac{dy}{dx} = 0$

SECTION B

[16]

7. Write the truth values of the following statements:
- i. Two is the only even prime number.
- ii. $\cos(2\theta) = \cos^2 \theta - \sin^2 \theta$, for all $\theta \in \mathbb{R}$. (2)
8. Find direction ratios of the line which is perpendicular to the lines with direction ratios 1, 3, 2 and -1, 1, 2. (2)
9. If the vectors $2\hat{i} - q\hat{j} + 3\hat{k}$ and $4\hat{i} - 5\hat{j} + 6\hat{k}$ are collinear, then find the value of q . (2)
10. Find the vector equation of the line passing through points A(3, 4, -7) and B(6, -1, 1). (2)
11. Differentiate $\log(1 + x^2)$ with respect to $\tan^{-1}x$. (2)
12. The displacement 's' of a particle at time 't' is given by $s = t^3 - 4t^2 - 5t$. Find its velocity and acceleration at time $t = 2$ seconds. (2)
13. Solve: $\int x^x \cdot (1 + \log x) dx$ (2)

OR

Solve: $\int \frac{10 \cdot x^9 + 10^x \log 10}{10^x + x^{10}} dx$

14. Find the area of region bounded by $y^2 = 24x$ and line $x = 1$. (2)

SECTION C

[18]

15. In any triangle ABC with the usual notations prove that $a^2 = b^2 + c^2 - 2bc \cos A$. (3)
16. If \vec{a} and \vec{b} are two non zero and non collinear vectors, then prove that any vector \vec{r} coplanar with \vec{a} and \vec{b} can be uniquely expressed as linear combination of \vec{a} and \vec{b} . (3)
17. The co-ordinates of the foot of a perpendicular drawn from the origin to the plane are (2, 3, 1). Find the equation of the plane in vector form. (3)

OR

Find the value of μ , if the points with position vectors $\hat{i} - \hat{j} + 3\hat{k}$ and $3\hat{i} + 4\hat{j} + \mu\hat{k}$ are equidistant from the plane $\vec{r} \cdot (5\hat{i} + 2\hat{j} - 7\hat{k}) + 8 = 0$.

18. If the function $f(x)$ is continuous on its domain $[-2, 2]$ where
- $$f(x) = \begin{cases} \frac{\sin ax}{x} + 2 & , \text{ for } -2 \leq x < 0 \\ = 3x + 5 & , \text{ for } 0 \leq x \leq 1 \\ = \sqrt{x^2 + 8} - b & , \text{ for } 1 < x \leq 2 \end{cases}$$
- find the values of a and b . (3)

19. The p.d.f. of continuous random variable X is given by
- $$f(x) = \begin{cases} \frac{x}{8} & , 0 < x < 4 \\ = 0 & , \text{ otherwise} \end{cases}$$
- Find i. $P(X \leq 2)$
- ii. $P(2 < X \leq 3)$
- iii. $P(X > 3)$ (3)

20. Suppose that 80% of all families own a television set. If 10 families are interviewed at random, find the probability that seven families own a television set. (3)

OR

The probability that a person undergoes a kidney operation will recover is 0.7. Find the probability that of six patients who undergo similar operations half of them will recover.

SECTION D

[40]

21. Using truth table, prove that:
 $p \leftrightarrow q \equiv (p \wedge q) \vee (\sim p \wedge \sim q)$ (4)

22. Find the inverse of matrix $\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 0 \end{bmatrix}$ by using elementary row transformations. (4)

OR

If $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$, find AB and $(AB)^{-1}$.

Verify that $(AB)^{-1} = B^{-1}A^{-1}$.

23. Show that $\sin^{-1}\left(\frac{5}{13}\right) + \cos^{-1}\left(\frac{3}{5}\right) = \tan^{-1}\left(\frac{63}{16}\right)$. (4)

24. Show that the equation $x^2 - 6xy + 5y^2 + 10x - 14y + 9 = 0$ represents a pair of lines. Find the acute angle between them. Also find the point of intersection of the lines. (4)

OR

Find the joint equation of a pair of lines passing through the origin each of which making an angle of 30° with the line $3x + 2y - 11 = 0$.

25. Solve the following L.P.P. using graphical method:
 Minimize: $z = 8x + 10y$
 Subject to $2x + y \geq 7$
 $2x + 3y \geq 15$
 $y \geq 2$
 $x \geq 0, y \geq 0$ (4)

26. If $y = f(x)$ is a differentiable function of x such that inverse function $x = f^{-1}(y)$ exists, then prove that x is a differentiable function of y and $\frac{dx}{dy} = \frac{1}{\frac{dy}{dx}}$, where $\frac{dy}{dx} \neq 0$

Hence find $\frac{d}{dx}[\sin^{-1}x]$. (4)

27. The surface area of a spherical balloon is increasing at the rate of $2 \text{ cm}^2/\text{sec}$. At what rate is the volume of the balloon is increasing when the radius of the balloon is 6 cm. (4)

28. Solve: $\int \frac{2\sin x + 3\cos x}{3\sin x + 4\cos x} dx$ (4)

OR

Solve: $\int \sec^3(2x) dx$

29. Prove that:
 $\int_{-a}^a f(x) dx = 2 \int_0^a f(x) dx$, if $f(x)$ is even function
 $= 0$, if $f(x)$ is odd function (4)

30. Solve the differential equation:
 $x \cdot y \frac{dy}{dx} = x^2 + 2y^2, y(1) = 0$ (4)



BOARD QUESTION PAPER : JULY 2019

BIOLOGY

Time: 3 Hours

Total Marks: 70

Note:

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- iii. Question paper consists of **30** questions divided into **FOUR** sections namely **A, B, C** and **D**.
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- v. **Section B:** Contains Q. Nos. **9 to 18** of **short answer** type questions carrying **two marks** each. Internal choice is provided **only to one** question.
- vi. **Section C:** Contains Q. Nos. **19 to 27** of **short answer** type of questions carrying **three marks** each. Internal choice is provided **only to one** question.
- vii. **Section D:** Contains Q. Nos. **28 to 30** of **long answer** type of questions carrying **five marks** each. Internal choice is provided to **each** question.
- viii. For each **MCQ**, **correct answer** must be written along with its **alphabet**, e.g., **(A)** / **(B)** / **(C)** / **(D)** etc.
- ix. In case of **MCQs**, (i.e. Q. No. 1 to 4) evaluation would be done for the **first attempt** only.
- x. Answer each section on a new page.
- xi. Figures to the right indicate full marks.

SECTION – A

[8]

- Q.1.** _____ drug is used for patients who have undergone surgery. (1)
 (A) Marijuana (B) Smack
 (C) Morphine (D) Cannabinoids
- Q.2.** Name the process by which all the three types of non-genetic RNAs are produced on DNA template. (1)
 (A) Translation (B) Transcription
 (C) Termination (D) Replication
- Q.3.** Which of the animal groups show uricotelism? (1)
 (A) Snake, rat, terrestrial insect
 (B) Penguin, reptile, snail
 (C) Land snail, bird, lizard
 (D) Tadpole larva of frog, marine fish, spider
- Q.4.** Approximately how many eggs are produced by a normal healthy human female up to the age of 25 years if the age of menarche is 12 years _____. (1)
 (A) 169 (B) 416
 (C) 240 (D) 100
- Q.5.** Name the process in which a tumour successfully spreads to the other parts of the body, grows and destroys healthy tissues. (1)
- Q.6.** What is humification? (1)
- Q.7.** Name the sexually transmitted disease caused by *Treponema pallidum*. (1)
- Q.8.** Which is the process that removes introns from RNA? (1)



SECTION – B

[20]

Q.9. Define fermentation. Write the names of substrate of alcoholic and lactic acid fermentation. (2)

Q.10. Complete the following chart and rewrite it: (2)

Genotype	Phenotype
$I^A I^A$ or $I^A i$	_____
_____	B
$I^A I^B$	_____
_____	O

Q.11 Your friend wants to start a business of Apiculture. Enlist the equipment he would need. (2)

Q.12 Give the role of (2)

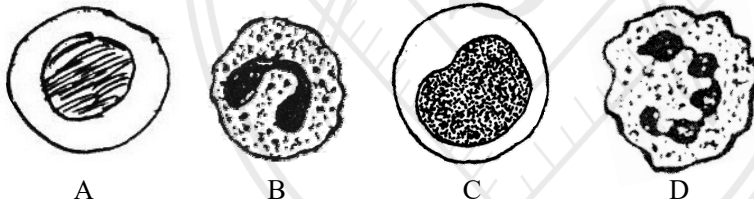
- Tissue plasminogen activator (TPA)
- Tissue growth factor-Beta (TGF- β) in Gene therapy.

Q.13 Match the following and rewrite it: (2)

	Group 'A'		Group 'B'
i.	Invertase	a.	<i>Trichoderma konigi</i>
ii.	Lipase	b.	<i>Saccharomyces cerevisiae</i>
iii.	Cellulase	c.	<i>Sclerotinia libertinia</i>
iv.	Pectinase	d.	<i>Rhizopus spp.</i>

Q.14 Sketch and label hairpin model of tRNA. (2)

Q.15 Identify and write the names of given diagrams A, B, C and D. (2)



OR

Dilip and Mohsin measured their blood pressure. Dilip's B.P. is 120/80 mmHg and Mohsin's B.P. is 160/100 mmHg. Who is suffering from hypertension? What are its causes?

Q.16 Give the functions of Kidney. (2)

Q.17 Give the location of following valves within human heart: (2)

- Eustachian valve
- Thebesian valve
- Bicuspid valve
- Tricuspid valve

Q.18 Define Green House Gases. Give any two examples. (2)

SECTION – C

[27]

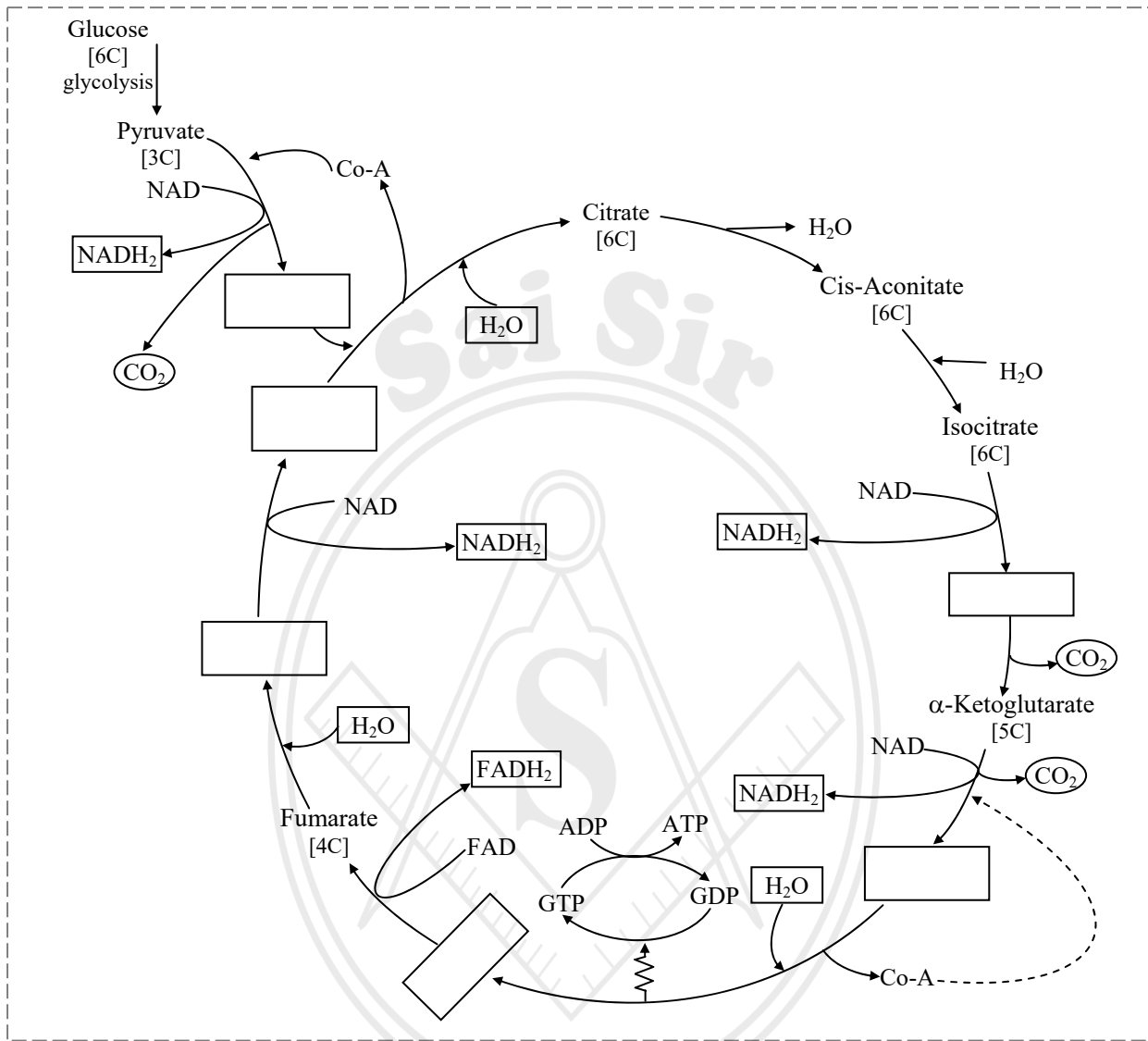
Q.19 Explain Homologous and Analogous organs with example. (3)

Q.20 A homozygous tall pea plant is crossed with its homozygous recessive parent. Find out the genotypic and phenotypic ratio with the help of Punnet square method. (3)

Q.21 Sketch and label the structure of Malpighian body and explain the structure of Bowman's capsule. (3)

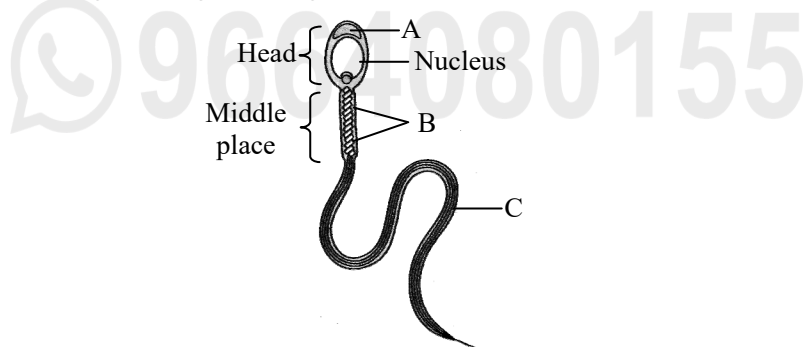


Q.22 Write down the names of missing intermediate compounds in a sequence in the given diagrammatic representation of Kreb's cycle. (3)



Q.23 Define jumping genes. Classify them on the basis of their mechanism. (3)

Q.24 Identify A, B, C in the given diagram and give their functions: (3)



OR

Explain various mechanical methods of birth control.

Q.25 Identify disorders developed in the given genotypes and give two symptoms of each: (3)

- i. 44 + XO
- ii. 44 + XXY

- Q.26** Name the interaction in: (3)
- Lichen
 - Sucker fish and shark
 - A protozoan living in the digestive tract of a flea living on a dog.

- Q.27** Given an account of various steps involved in tissue culture. (3)

SECTION – D

[15]

- Q.28** Give the diagrammatic representation of HSK-pathway and answer the following questions: (5)
- Why is photorespiration avoided in C_4 pathways?
 - Give any two examples of C_4 plants.
 - Name the CO_2 acceptor in mesophyll cells during HSK pathway.

OR

Identify and explain with the help of diagrammatic representation, type of photophosphorylation in which P_{700} (PS II) and P_{680} (PS I) both are involved.

- Q.29** Give reasons: (5)
- Pituitary gland was formerly called as 'master endocrine gland'.
 - Oxytocin is 'birth hormone'.
 - People living in hilly region are advised to use iodised salt.
 - Old age persons show weakened immune response.
 - Pancreas is a dual gland.

OR

Describe functional areas of cerebrum with the help of neat and labelled diagram.

- Q.30** Define pollination. Explain different types of self and cross pollination with suitable examples. (5)

OR

Sketch and label the V.S. of anatropous ovule and answer the following questions:

- How many mitotic divisions are required to produce embryo sac?
- Which part of ovule is converted into seed coat?
- Which part provides the passage for entry of pollen tube during fertilization?

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