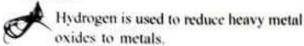
- 63 Some tranquilizers are listed below. Which one from the following belongs to barbiturates?
  - (1) Veronal
    - (2) Chlordiazepoxide
    - (3) Meprobamate
  - (4) Valium
- 64 Which of the following statements are NOT correct?



- Heavy water is used to study reaction mechanism.
- C. Hydrogen is used to make saturated fats from oils.

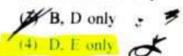
lowest as compared to a single bond between two atoms of any element.



Hydrogen reduces oxides of metals that are more active than iron.

Choose the **most appropriate** answer from the options given below:

- (1) A, B, C only
- (2) B, C, D, E only



- 65 For a certain reaction, the rate = k[A]<sup>2</sup>[B], when the initial concentration of A is tripled keeping concentration of B constant, the initial rate would
  - (1) increase by a factor of three.
  - (2) decrease by a factor of nine.
  - (3) increase by a factor of six.
  - (4) increase by a factor of nine.

- 66 Which one is an example of heterogenous catalysis?
  - (1) Combination between dinitrogen and diffydrogen to form ammonia in the presence of finely divided from
  - (2) Oxidation of sulphur dioxide into sulphur trioxide in the presence of oxides of nitrogen.
  - (3) Hydrolysis of sugar catalysed by H
  - Decomposition of ozone in presence of nitrogen monoxide.

No, O3, h, So, H, Y's

67 Which one of the following statements is correct?

Mg plays roles in neuromuscular function and interneuronal transmission.

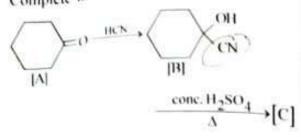
- (2) The daily requirement of Mg and Ca in the human body is estimated to be 0.2 0.3 g.
- (3) All enzymes that utilise ATP in phosphate transfer require Ca as the cofactor.
- (4) The bone in human body is an inert and unchanging substance.
- 68 Weight (g) of two moles of the organic compound, which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is:
  - (1) 18
- (2) 16
- (3) 32
- (4) 30
- 69 The element expected to form largest ion to achieve the nearest noble gas configuration is:
  - (1) Na
- (2) ()
- (3) F



G6\_English I K (A) (B) 10
K (3A) CB)

50CH 2 (a) H, 30,

# 57 Complete the following reaction :



### 58 Given below are two statements:

Statement I: A unit formed by the attachment of a base to 1' position of sugar is known as nucleoside

to phosphorous acid at 5'-position of sugar moiety, we get nucleotide.

In the light of the above statements, choose the **correct** answer from the options given below:

Statement I is false but Statement II is true.

- Both Statement I and Statement II are true.
- (3) Both Statement I and Statement II are false.
- (4) Statement I is true but Statement II is false.
- A compound is formed by two elements A and B. The element B forms cubic close packed structure and atoms of A occupy 1/3 of tetrahedral voids. If the formula of the compound is A<sub>x</sub>B<sub>y</sub>, then the value of x+y is in option
  - (I) 2
  - (3) 4

G6\_English 1

72.683

- 60 The stability of Cu<sup>2+</sup> is more than Cu<sup>+</sup> salts in aqueous solution due to -
  - (1) second ionisation enthalpy.
  - (2) first ionisation enthalpy.
  - enthalpy of atomization.
  - (4) hydration energy.

#### 61 Match List - I with List - II :

List - I

A. Coke

I. Carbon atoms are sp<sup>3</sup> hybridised.

B. Diamond

II. Used as a dry lubricant

- C. Fullerene III. Used as a reducing agent
- D. Graphite IV. Cage like molecules

Choose the correct answer from the options given below:

- A-III, B-IV, C-I, D-II
- (2) A-II, B-IV, C-I, D-III
- (3) A-IV, B-I, C-II, D-III
- A-III, B-I, C-IV, D-II
- Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: Helium is used to dilute Le oxygen in diving apparatus.

Reasons R: Helium has high solubility in  $O_2$ .

In the light of the above statements, choose the **correct** answer from the options given below:

- (1) A is false but R is true.
- Both A and R are true and R is the correct explanation of A.
- (3) Both A and R are true and R is NOT the correct explanation of A.
- (4) A is true but R is false.

1 + 4 1 1 1 1 1 2 2

## Chemistry: Section-A (Q. No. 51 to 85)

- Taking stability as the factor, which one of 51 the following represents correct relationship?
  - (1) TH > TH<sub>3</sub> (2) TICl<sub>3</sub> > TICl<sub>3</sub>

  - (3) Inl<sub>3</sub> > Inl (4) AlCl > AlCl<sub>3</sub>

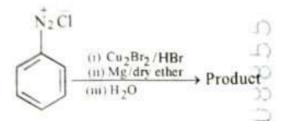
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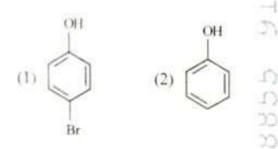
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20

10

Identify the product in the following reaction:







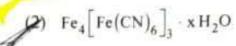
The given compound 53

is an example of

- (1) vinylic halide
- (2) benzylic halide
- (3) aryl halide
- allylic halide

G6\_English |

- In Lassaigne's extract of an organic compound, both nitrogen and sulphur are present, which gives blood red colour with Fe3+ due to the formation of -
  - (1) Fe(SCN) 2+



- (3) NaSCN
- (4) \[ \text{Fe(CN)}\_s \text{NOS} \]^{4-}
- 55 Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: A reaction can have zero activation energy.

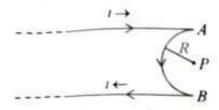
Reasons R: The minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value, is called activation energy.

In the light of the above statements, choose the correct answer from the options given below :

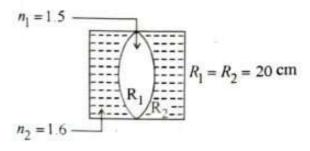
- (1) A is false but R is true.
- (2) Both A and R are true and R is the correct explanation of A.
- (3) Both A and R are true and R is NOT the correct explanation of A.
- (4) A is true but R is false.
- The right option for the mass of CO2 56 produced by heating 20 g of 20% pure limestone is (Atomic mass of Ca = 40)

$$\left[ \text{CaCO}_3 \xrightarrow{-1200 \text{ K}} \text{CaO} + \text{CO}_2 \right]$$

A very long conducting wire is bent in a 44 semi-circular shape from A to B as shown in figure. The magnetic field at point P for steady current configuration is given by

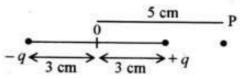


- (1)  $\frac{\mu_0 i}{4R} \left| 1 \frac{2}{\pi} \right|$  pointed into the page
- (2)  $\frac{\mu_0 i}{4R}$  pointed into the page
- (3)  $\frac{\mu_0 t}{4R}$  pointed away from the page
- pointed away from page
- 45 In the figure shown here, what is the equivalent focal length of the combination of lenses (Assume that all layers are thin)?



- (1) 50 cm
- (3) -40 cm
- 46 Two thin lenses are of same focal lengths (f), but one is convex and the other one is concave. When they are placed in contact with each other, the equivalent focal length of the combination will be:
  - (1) Infinite
- (2) Zero
- (3) f/4
- (4) 1/2

- A wire carrying a current I along the positive x-axis has length L. It is kept in a magnetic field  $\vec{B} = (2\hat{i} + 3\hat{j} - 4\hat{k})$  T. The magnitude of the magnetic force acting on the wire is:
  - (1) √3 1L
- (2) 3 IL
- (3) √5 IL
- (4) 5 IL
- A bullet from a gun is fired on a rectangular wooden block with velocity u. When bullet travels 24 cm through the block along its length horizontally, velocity of bullet becomes  $\frac{u}{3}$ . Then it further penetrates into the block in the same direction before coming to rest exactly at the other end of the block. The total length of the block is:
  - (1) 30 cm
- 27 cm
- (3) 24 cm
- 49 An electric dipole is placed as shown in the figure.



The electric potential (in 10<sup>2</sup> V) at point P due to the dipole is  $(\epsilon_0 = permittivity of free$ 

space and  $\frac{1}{4\pi \epsilon_0} = K$ ):

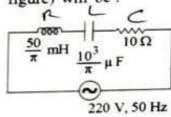
- (1)  $\left(\frac{8}{3}\right)$  qK (2)  $\left(\frac{3}{8}\right)$  qK
- (3)  $\left(\frac{5}{8}\right) qK$  (4)  $\left(\frac{8}{5}\right) qK$
- 50 A horizontal bridge is built across a river. A student standing on the bridge throws a small ball vertically upwards with a velocity 4 m s<sup>-1</sup>. The ball strikes the water surface after 4 s. The height of bridge above water surface is (Take  $g = 10 \text{ m s}^{-2}$ ):
  - (1) 68 m
- (2) 56 m
- 60 m
- (4) 64 m

### Physics: Section-B (Q. No. 36 to 50)

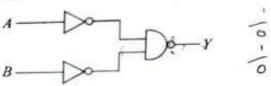
The radius of inner most orbit of hydrogen 36 atom is 5.3×10<sup>-11</sup> m. What is the radius of third allowed orbit of hydrogen atom?



- (2) 0.53 A
- (3) 1.06 Å
- (4) 1.59 Å
- The resistance of platinum wire at 0°C is 37  $2\Omega$  and  $6.8\Omega$  at 80°C. The temperature coefficient of resistance of the wire is:
  - (1)  $3\times10^{-1}$  °C<sup>-1</sup> (2)  $3\times10^{-4}$  °C<sup>-1</sup> (3)  $3\times10^{-3}$  °C<sup>-1</sup> (4)  $3\times10^{-2}$  °C<sup>-1</sup>
- The net impedance of circuit (as shown in 38 figure) will be:

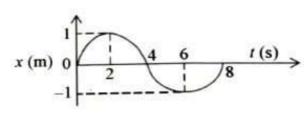


- (1) 25Ω
- (2) 10√2 Ω
- (3) 15 Ω
- For the following logic circuit, the truth table 39 is:



- (1) A

- 10 resistors, each of resistance R are connected in series to a battery of emf E 40 and negligible internal resistance. Then those are connected in parallel to the same battery, the current is increased n times. The value of n is:
  - (1) 1000
- (2) 10
- 100
- (4) 1
- Calculate the maximum acceleration of a moving car so that a body lying on the floor 41 of the car remains stationary. The coefficient of static friction between the body and the floor is  $0.15 (g = 10 \text{ m s}^{-2})$ .
  - (1) 50 m s<sup>-2</sup>
- (2)  $1.2 \,\mathrm{m \, s}^{-2}$
- (3) 150 m s<sup>-2</sup>
- (4) 1.5 m s<sup>-2</sup>
- The x-t graph of a particle performing simple 42 harmonic motion is shown in the figure. The acceleration of the particle at t=2 s is:

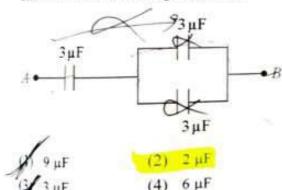


- (3)  $-\frac{\pi^2}{9} \,\mathrm{m \, s^{-2}}$  (4)  $\frac{\pi^2}{16} \,\mathrm{m \, s^{-2}}$
- A satellite is orbiting just above the surface 43 of the earth with period T. If d is the density of the earth and G is the universal constant

of gravitation, the quantity  $\frac{3\pi}{Gd}$  represents:

- (1)  $\sqrt{T}$
- (2) T
- $(3) T^2$
- $(4) T^3$

- The amount of energy required to form a soap bubble of radius 2 cm from a soap solution 27 is nearly: (surface tension of soap solution = 0.03 N m<sup>-1</sup>)
  - (1) 50.1×10<sup>-4</sup>J
- (2) 30.16×10<sup>-4</sup>J
- (3) 5.06×10<sup>-4</sup>J
- (4) 3.01×10<sup>-4</sup>J
- The half life of a radioactive substance is 20 minutes. In how much time, the activity 28 of substance drops to  $\left(\frac{1}{16}\right)^{th}$  of its initial value?
  - (1) 80 minutes
- (2) 20 minutes
- (3) 40 minutes
- (4) 60 minutes
- The potential energy of a long spring when 29 stretched by 2 cm is U. If the spring is stretched by 8 cm. potential energy stored in it will be:
  - (1) 161
- (2) 2U
- (3) 4U
- (4) 8U
- The equivalent capacitance of the system 30 shown in the following circuit is:



- 31 A vehicle travels half the distance with speed 6 and the remaining distance with speed 26. Its average speed is:

- 32 The ratio of radius of gyration of a solid sphere of mass M and radius R about its own axis to the radius of gyration of the thin hollow sphere of same mass and radius about its axis is :
  - (1) 5:2



- (3) 5:3
- Two bodies of mass m and 9m are placed at 33 a distance R. The gravitational potential on the line joining the bodies where the gravitational field equals zero, will be (G = gravitational constant):
- (3)  $-\frac{12 Gm}{R}$
- The venturi-meter works on: 34
  - (1) The principle of perpendicular axes
  - (2) Huygen's principle
  - (3) Bernoulli's principle
  - (4) The principle of parallel axes
- 35 An ac source is connected to a capacitor C. Due to decrease in its operating frequency:
  - (1) capacitive reactance remains constant
  - (2) capacitive reactance decreases.

displacement current increases.

displacement current decreases.

Resistance of a carbon resistor determined from colour codes is  $(22000 \pm 5\%) \Omega$ . The colour of third band must be :

- (1) Yellow
- Red Red
- (3) Green
- (4) Orange

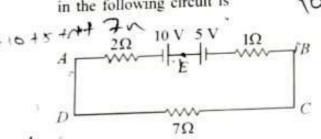
The magnetic energy stored in an inductor of inductance 4 µH carrying a current of 2 A

- is: w.
  - (1) 8 µJ
- (2) 4 µJ
- (3) 4 mJ
- (4) 8 mJ

In a series LCR circuit, the inductance L is 10 mH, capacitance C is 1 μF and resistance R is  $100 \Omega$ . The frequency at which resonance occurs is :

- (1) 1.59 kHz
- (2) 15.9 rad/s
- (3) 15.9 kHz
- (4) 1.59 rad/s

The magnitude and direction of the current in the following circuit is



- (1) 1.5 A from B to A through E
- 0.2 A from B to A through E
- (3) 0.5 A from A to B through E
- (4)  $\frac{3}{9}$  A from A to B through E

The minimum wavelength of X-rays 22 produced by an electron accelerated through a potential difference of V volts is proportional to:

- (1)  $V^2$
- (2) \( \sqrt{V} \)

The errors in the measurement which arise The errors in the moderable fluctuations in temperature and voltage supply are : 23

- (1) Random errors
- (2) Instrumental errors
- (3) Personal errors
- (4) Least count errors

For Young's double slit experiment, two statements are given below: 24

Statement I: If screen is moved away from the plane of slits, angular separation of the fringes remains constant.

Statement II: If the monochromatic source is replaced by another monochromatic source of larger wavelength, the angular separation of fringes decreases.

In the light of the above statements, choose the correct answer from the options given below:

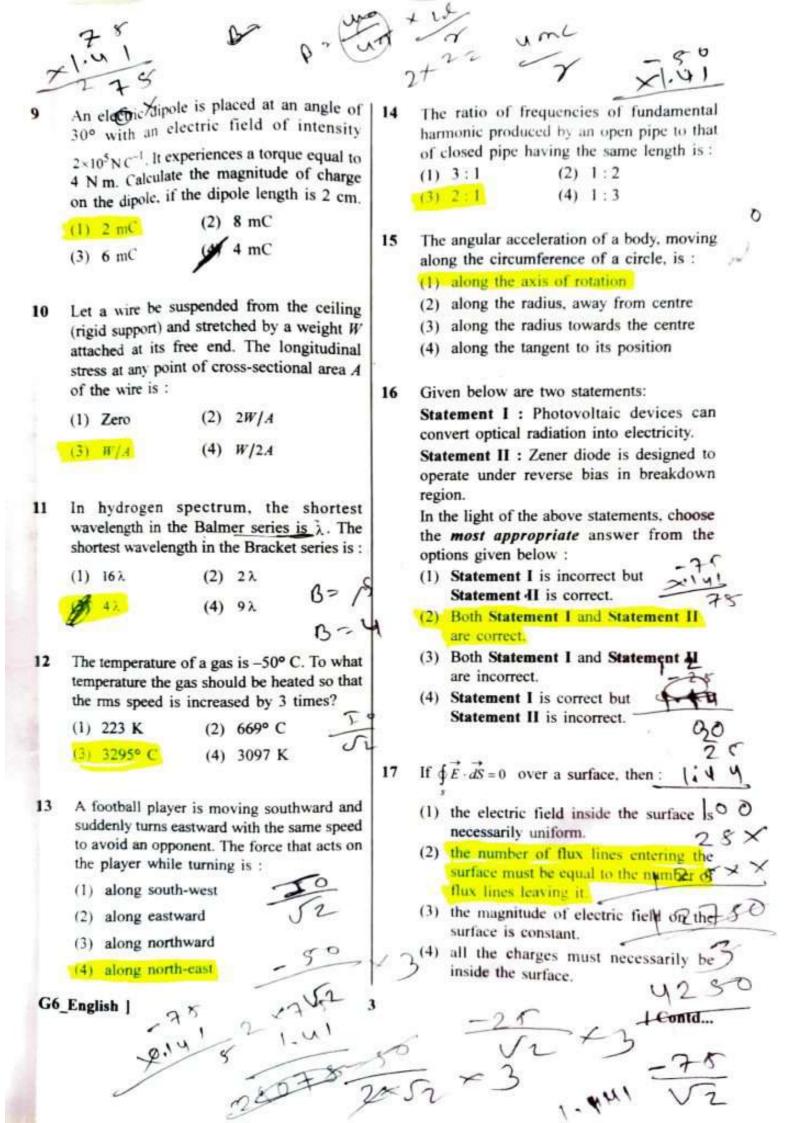
- (1) Statement I is false but Statement II is true.
- (2) Both Statement I and Statement II are true.
- (3) Both Statement I and Statement II are false.
- (4) Statement I is true but Statement II is false.

A bullet is fired from a gun at the speed of 25 280 m s-1 in the direction 30° above the horizontal. The maximum height attained by the bullet is  $(g = 9.8 \text{ m s}^{-2}, \sin 30^\circ = 0.5)$ :

- (1) 3000 m
- (2) 2800 m
- (3) 2000 m
- (4) 1000 m

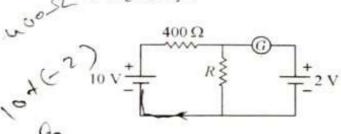
A Carnot engine has an efficiency of 50% 26 when its source is at a temperature 327° C. The temperature of the sink is:

- (1) 200° C
- (2) 27° C
- (3) 15° C
- (4) 100° C



#### Physics: Section-A (O. No. 1 to 35)

- The work functions of Caesium (Cs), 5 Potassium (K) and Sodium (Na) are 2.14 eV, 2.30 eV and 2.75 eV respectively. If incident electromagnetic radiation has an incident energy of 2.20 eV, which of these photosensitive surfaces may emit photoelectrons?
  - (1) Na only
  - (2) Cs only
    - (3) Both Na and K
    - (4) K only
- 2 The net magnetic flux through any closed surface is :
  - (1) Negative
- 2) Zero
- (3) Positive
- (4) Infinity
- 3 If the galvanometer G does not show any deflection in the circuit shown, the value of R is given by:



- (1) 400 Ω
- (2) 200 Ω
- (4) 100 Ω
- A 12 V, 60 W lamp is connected to the secondary of a step down transformer, whose primary is connected to ac mains of 220 V. Assuming the transformer to be ideal, what is the current in the primary winding?
  - (1) 0.37 A
- (2) 0.27 A
- (3) 2.7 A
- (4) 3.7 A

- A full wave rectifier circuit consists of two p-n junction diodes, a centre-tapped transformer, capacitor and a load resistance. Which of these components remove the ac ripple from the rectified output?
  - (1) Load resistance
  - (2) A centre-tapped transformer
  - (3) p-n junction diodes
  - (4) Capacitor
- In a plane electromagnetic wave travelling in 6 free space, the electric field component oscillates sinusoidally at a frequency of 2.0×1010 Hz and amplitude 48 V m-1. Then the amplitude of oscillating magnetic field is: (Speed of light in free space =  $3 \times 10^8$  m s<sup>-1</sup>)
  - (1) 1.6×10<sup>-6</sup>T
- (2) 1.6×10<sup>-9</sup>T
- (3)  $1.6 \times 10^{-8}$  T
- (4) 1.6×10<sup>-7</sup>T
- 7 A metal wire has mass (0.4 ± 0.002) g, radius  $(0.3 \pm 0.001)$  mm and length  $(5 \pm 0.02)$  cm. The maximum possible percentage error in the measurement of density will nearly be:
  - (1) 1.4%
- (2) 1.2%
- (3) 1.3%
- (4) 1.6%
- Light travels a distance x in time  $t_1$  in air 8 and 10x in time  $t_2$  in another denser medium. What is the critical angle for this medium?
- (3)  $\sin^{-1} \left( \frac{10 t_2}{t_1} \right)$  (4)  $\sin^{-1} \left( \frac{t_1}{10 t_2} \right)$

Lest Booklet Code

IAD

This Booklet contains 32 pages, including Rough Page. Do not open this Test Booklet until you are asked to do so.

Important Instructions:

The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the The Answer Sheet and fill in the particulars on ORIGINAL Copy carefully with blue/black ball point pen only.

The test is of 3 hours 20 minutes duration and the Test Booklet contains 200 multiple-choice questions (fost options with a single correct answer) from Physics, Chemistry and Biology (Botany and Zoology). 50 questions in each subject are divided into two Sections (A and B) as per details given below:

(a) Section A shall consist of 35 (Thirty-five) Questions in each subject (Question Nos - 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All questions are compulsory.

(b) Section B shall consist of 15 (Fifteen) questions in each subject (Question Nos - 36 to 50, 86 to 100, 136 to 150 and 186 to 200). In Section B, a candidate needs to attempt any 10 (Ten) questions out of 15 (Fifteen) in each subject.

Candidates are advised to read all 15 questions in each subject of Section B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, the first ten questions answered by the candidate shall be evaluated.

3. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total scores. The maximum marks are 720.

4. Use Blue/Black Ball Point Pen only for writing particulars on this page/marking responses on Answer Sheet.

Rough work is to be done in the space provided for this purpose in the Test Booklet only.

- 6. On completion of the test, the candidate must hand over the Answer Sheet (ORIGINAL and OFFICE Copy) to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
- 7. The CODE for this Booklet is G6. Make sure that the CODE printed on the Original Copy of the Answer Sheet is the same as that on this Test Booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.

The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.

Use of white fluid for correction is NOT permissible on the Answer Sheet.

10. Each candidate must show on-demand his/her Admit Card to the Invigilator.

- 11. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
- 12. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet twice. Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.

Use of Electronic/Manual Calculator is prohibited.

14. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this

15. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances. 16. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the

G6 English |

17. Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes idate (having a physical limitation to write) uses the facility of Scribe or not.

duration, whether such candidate (naving a physical initial
Name of the Candidate (in Capitals): DARJI KIRAN
Roll Number: In figures 2214010383  : In words Two Two one four some 2000 Three eight three
Centre of Examination (in Capitals): 5HRI UNIDHLAXI VIDYAMANDIR PALANPU
Candidate's Signature: Invigilator's Signature:
Faccimile signature stamp of Centre Superintendent

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