NATIONAL TALENT SEARCH EXAMINATION (NTSE-2022) STAGE -1

STATE : TAMILNADU PAPER : SAT

Date: 05/02/2022

Max. Marks: 100 **SOLUTIONS** **Time allowed: 120 mins**

MATHEMATICS

101. The simplified value of $(81)^{1/4} - 8 \times (216)^{1/3} + 15 \times (32)^{1/5} + \sqrt{225}$ is:

(1) 2 (2) –5 (3) 0 (4) 7

Ans. (3)

Sol. $(81)^{1/4} - 8 \times (216)^{1/3} + 15 \times (32)^{1/5} + \sqrt{225}$

$= 3 - 8 \times 6 + 15 \times 2 + 15$

$= 48 - 48$

$= 0$

102. Which of the following statement is **incorrect**?

(1) Every natural number is a whole number

(2) Every integer is a rational number

(3) Every rational number is an integer

(4) Every rational number is a real number

Ans. (3)

Sol. The statement, "Every rational number is integer" is incorrect.

For example, $\frac{2}{3}$ is rational number.

But, it is not an integer.

103. If $x + \frac{1}{x} = 7$, then the value of $x^3 + \frac{1}{x^3}$ is:

(1) –140 (2) 322 (3) 215 (4) –49

Ans. (2)

Sol. $x+\frac{1}{x}=7$

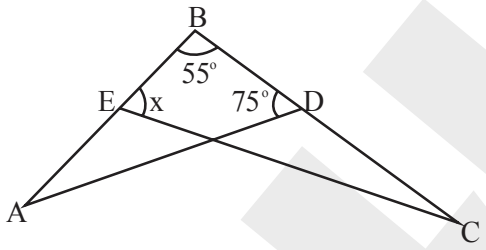
$$\left(x+\frac{1}{x}\right)^3=7^3$$

$$x^3+\frac{1}{x^3}+3.x.\frac{1}{x}\left(x+\frac{1}{x}\right)=343$$

$$x^3+\frac{1}{x^3}+3(7)=343$$

$$x^3+\frac{1}{x^3}=322$$

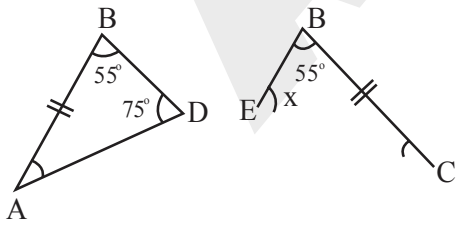
104. In the given figure, if AB = BC and $\angle A=\angle C$, then the value of x is:



(1) 40° (2) 50° (3) 90° (4) 75°

Ans. (4)

Sol.



$\Delta ABD \cong \Delta CBE$ (ASA congruency)

$\therefore \angle BDA = \angle BEC$ (CPCT)

$75^\circ = x$

Therefore, $x = 75^\circ$.

105. If the lateral surface area of a cube is 196 cm^2, then the volume is _____.

(1) 3000 cm^3 (2) 49 cm^3 (3) 256 cm^3 (4) 343 cm^3

Ans. (4)

Sol. Lateral Surface Area of cube = 196 cm^2

$4a^2 = 196$

$a^2 = 49$

$a = 7$ cm

Therefore, volume of cube,

$v = a^3$

$= 7^3$

$= 343\ cm^3$

106. If mode of 4, 9, 5, 4, 9, 4, 9 and x – 10 is 9 then x is:

(1) 10 (2) 14 (3) 12 (4) 19

Ans. (4)

Sol. 4, 9, 5, 4, 9, 4, 9, x – 10

Mode = x – 10 = 9

x = 19

107. If $\frac{p}{q}$ and $\frac{r}{s}$ are any two rational numbers such that $\frac{p}{q} < \frac{r}{s}$, then which of the following is true?

(1) $\frac{p}{q} < \frac{p+r}{q+s} < \frac{r}{s}$ (2) $\frac{p}{q} < \frac{p-r}{q-s} < \frac{r}{s}$

(3) $\frac{p}{q} < \frac{r}{s} < \frac{p+r}{q+s}$ (4) $\frac{p+r}{q+s} < \frac{p}{q} < \frac{r}{s}$

Ans. (1)

Sol. $\frac{p}{q} < \frac{r}{s} \Rightarrow \frac{p}{r} < \frac{q}{s}$

$\frac{p+r}{r} < \frac{q+s}{s}$

$\frac{p+r}{q+s} < \frac{r}{s}$ ..... (1)

$$\frac{p}{q}<\frac{r}{s} \Rightarrow \frac{p}{r}<\frac{q}{s} \Rightarrow \frac{r}{p}>\frac{s}{q}$$

$$\frac{p+r}{p}>\frac{q+s}{q}$$

$$\frac{p+r}{q+s}>\frac{p}{q} \qquad \text{..... (2)}$$

From (1) and (2)

$$\frac{p}{q}<\frac{p+r}{q+s}<\frac{r}{s}$$

108. The square root of $(a^2 + b^2 + 2ab)$ is:

(1) $(a \pm b)$ (2) $(a - b)$ (3) $\pm(a + b)$ (4) $(a^2 + b^2)$

Ans. (3)

Sol. $(a^2 + b^2 + 2ab) = (a + b)^2$

$\therefore \sqrt{a^2 + b^2 + 2ab} = \pm(a + b)$

109. Which of the following are not a polynomial?

(a) $6x^{-2} - 7x^3 + 8x + 1$

(b) $x - \frac{1}{x}$

(c) $\sqrt{5}y^2 - \sqrt{3}y + 1$

(d) $m^2 - \sqrt{m} + 7$

(1) (a), (b) (2) (a), (b), (c) (3) (a), (b), (d) (4) All of the above

Ans. (3)

Sol. $\left.\begin{array}{l}(a)\,6x^{-2} - 7x^3 + 8x + 1 \\ (b)\,x - \frac{1}{x} \\ (c)\,m^3 - \sqrt{m} + 7\end{array}\right\}$ are not polynomials

Therefore, option (3)

110. If $x + y + z = 0$, then:

(1) $x^2 + y^2 + z^2 = 0$ (2) $x^3 + y^3 + z^3 = 3xyz$

(3) $x^2 + y^2 + z^2 = xyz$ (4) $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 1$

Ans. (2)

Sol. $x + y + z = 0$ ..... (1)

$x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$

$= (0)(x^2 + y^2 + z^2 - xy - yz - zx) \quad (\because \text{from}(1))$

$= 0$

$\Rightarrow x^3 + y^3 + z^3 = 3xyz$

111. The quotient and divisors are $(x^2 + 3x + 2)$ and $(x + 5)$. If the remainder is 0, then the corresponding polynomial is:

(1) $x^3 + 8x^2 + 17x + 10$ (2) $x^3 - 8x^2 + 17x + 10$

(3) $x^3 + 8x^2 - 17x + 10$ (4) $x^3 - 8x^2 + 17x - 10$

Ans. (1)

Sol. $q(x) = x^2 + 3x + 2 \rightarrow$ Quotient, $q(x) = x^2 + 3x + 2$

$g(x) = x + 5 \rightarrow$ Divisor, $g(x) = (x + 5)$

Remainder, $r(x) = 0$

By division rule,

$p(x) = g(x) \cdot q(x) + r(x)$

$= (x^2 + 3x + 2)(x + 5) + 0$

$= x^3 + 5x^2 + 3x^2 + 15x + 2x + 10$

$= x^3 + 8x^2 + 17x + 10$

112. The remainder when $(3x^3 - 4x^2 - 5)$ is divided by $(3x + 1)$ is:

(1) $\frac{50}{9}$ (2) $\frac{-50}{9}$ (3) $\frac{45}{9}$ (4) $\frac{-45}{9}$

Ans. (2)

Sol. Let $p(x) = 3x^3 - 4x^2 - 5$

Remainder when p (x) is divided by (3x + 1), is

$$p\left(-\frac{1}{3}\right) = 3\left(-\frac{1}{3}\right)^3 - 4\left(-\frac{1}{3}\right)^2 - 5$$

$$= \cancel{3}\left(-\frac{1}{\cancel{27}_{9}}\right) - 4\left(\frac{1}{9}\right) - 5$$

$$= \frac{-1}{9} - \frac{4}{9} - 5$$

$$= \frac{-5-45}{9}$$

$$= \frac{-50}{9}$$

113. G.C.D. of $25\,\ell^2m^3n^4, 49x^2y^4z^5, 64kp^5q^8$:

(1) 78400 (2) 0 (3) 1 (4) 784

Ans. (3)

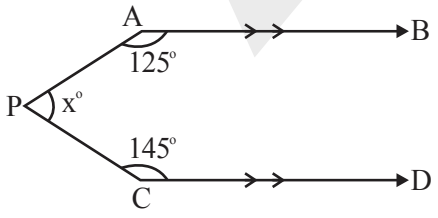
Sol. $25\ell^2m^3n^4 = 5^2 . \ell^2 . m^3 . n^4$

$49x^2y^4z^5 = 7^2 . x^2 . y^4 . z^5$

$64kp^5q^8 = 2^6 . k . p^5 . q^8$

Therefore, G.C.D. = 1

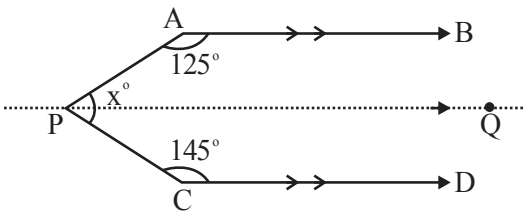
114. In the given figure AB is parallel to CD, the value of x is:



(1) 270° (2) 135° (3) 70° (4) 90°

Ans. (4)

Sol.



Draw $\overline{PQ}$ parallel to $\overline{AB}$

Therefore, from figure,

$\angle APQ + 125^\circ = 180^\circ$

$\angle APQ = 55^\circ$

Also, $\angle CPQ + 145^\circ = 180^\circ$

$\angle CPQ = 35^\circ$

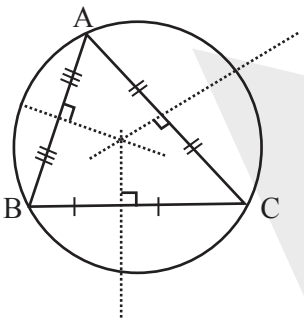
$\therefore\ x = 55^\circ + 35^\circ = 90^\circ$

115. The number of circles can be obtained through three non-collinear points is:

(1) 1 (2) 2 (3) 3 (4) 4

Ans. (1)

Sol.



One circle can be drawn through three non-collinear points.

116. If $\frac{a^3}{a-b}$ is added with $\frac{b^3}{b-a}$ then the new expression is:

(1) $a^3 + b^3$ (2) $a^2 - ab + b^2$ (3) $a^2 + ab + b^2$ (4) $a^3 - b^3$

Ans. (3)

Sol. $\frac{a^3}{a-b}+\frac{b^3}{b-a}=\frac{a^3}{a-b}-\frac{b^3}{a-b}$

$=\frac{a^3-b^3}{(a-b)}$

$=\frac{\cancel{(a-b)}\left(a^2+ab+b^2\right)}{\cancel{(a-b)}}$

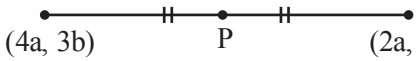
$= a^2 + ab + b^2$

117. The mid-point of the line segment joining (4a, 3b) and (2a, –b) is:

(1) (3a, b) (2) (2a, 4b) (3) (2a, 2b) (4) (–a, 2b)

Ans. (1)

Sol.



Mid-point, $P=\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$

$=\left(\frac{4a+2a}{2},\frac{3b-b}{2}\right) \quad =(3a,b)$

118. The slope and y-intercept of the straight line $8x – 7y + 6 = 0$ is:

(1) $\left(\frac{8}{7},\frac{6}{7}\right)$ (2) (3, 6) (3) $\left(\frac{4}{7},\frac{1}{7}\right)$ (4) $\left(\frac{1}{7},2\right)$

Ans. (1)

Sol. $8x – 7y + 6 = 0$

$7y = 8x + 6$

$y=\left(\frac{8}{7}\right)x+\left(\frac{6}{7}\right)$

Which in the form of $y = mx + c$

$\therefore$ Slope $(m)=\frac{8}{7}$

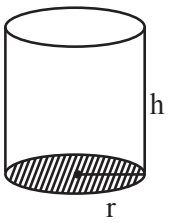
y-intercept $(c) =\frac{6}{7}$

119. Base area of a right circular cylinder is 80 cm^2. If its height is 5 cm, then the volume is equal to:

(1) $\frac{400}{3} cm^3$ (2) 16 cm^3 (3) 200 cm^3 (4) 400 cm^3

Ans. (4)

Sol.



For a right circular cylinder,

Base area $\left(\pi r^2\right) = 80\ cm^2$

Height (h) = 5 cm

Therefore, volume (v) = Base area × Height

$= 80 \times 5$

$= 400\ cm^3$

120. Probability of getting 3 heads or 3 tails in tossing a coin 3 times is:

(1) $\frac{1}{8}$ (2) $\frac{1}{4}$ (3) $\frac{3}{8}$ (4) $\frac{1}{2}$

Ans. (2)

Sol. A coin tossed 3 times,

S = {HHH, HHT, HTH, HTT, THH, THT, TTH, TTT}

n (S) = 8

A = Getting 3 heads or 3 tails

= {HHH, TTT}

n (A) = 2

$$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{2}{8} = \frac{1}{4}$$

SCIENCE

121. A sound is heard 8 sec. later than the lightning is seen in the sky on a rainy day. Find the distance of location of lightning. [speed of sound = 346 ms^{-1}]

(1) 2768 m (2) 1740 m (3) 1730 m (4) 2778 m

Ans. (1)

Sol. $d = v_s \times t$

$d = 346 \times 8$

$= 2768\,m$

122. Find the **incorrect** statement(s):

(a) The device used to convert ac into dc is called rectifier

(b) The device used to convert dc into ac is called inverter

(c) The alternating current (ac) can be carried over long distances using battery

(1) (a) only (2) (b) and (c) only (3) (c) only (4) (a) and (b) only

Ans. (3)

Sol. Statement (c) is wrong.

123. Snell's law is given by the formula:

(1) $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$ (2) $m = \frac{h_i}{h_o}$ (3) $\frac{\sin i}{\sin r} = \mu$ (4) $f = \frac{R}{2}$

Ans. (3)

Sol. Snell's law is given by formula $\frac{\sin i}{\sin r} = \mu$.

124. If 30 C of charge is determined to pass through a wire of any cross-section in 2 mins, then the measure of current is:

(1) 0.2 A (2) 0.25 A (3) 0.3 A (4) 0.4 A

Ans. (2)

Sol. $I = \frac{Q}{t}$

$Q = 30C;\ t = 120\ sec$

$I = \frac{30}{120} = 0.25\,A$

125. Pick out the **incorrect** pair:

(1) Least count of Vernier caliper - 0.01 cm

(2) 1 light year - 9.46×10^{15} m

(3) 1 Angstrom - 10^{-10} m

(4) Least count of screw gauge - 0.1 mm

Ans. (4)

Sol. Least count of screw gauge is 0.01 mm.

126. In petrol bunks, the tyre pressure of vehicles is measured in a unit called _____.

(1) Cd (2) Psi (3) mol (4) A

Ans. (2)

Sol. In petrol bunks, the tyre pressure of vehicles is measured in a unit called as Psi.

127. A train starting from a railway station and moving with uniform acceleration attains a speed of 40 km/h in 10 minutes. Its acceleration is:

(1) $\frac{5}{27}$ km / hr (2) $\frac{1}{54}$ m / s^2 (3) 4 m / s^2 (4) 4 km / hr

Ans. (2)

Sol. u = 0

$$v = 40 \times \frac{5}{18} = \frac{100}{9} \text{m / s}$$

t = 10 × 60 = 600 sec.

$$a = \frac{v - u}{t} = \frac{\left(\frac{100}{9} - 0\right)}{600} = \frac{100}{5400}$$

$$a = \frac{1}{54} \text{m / s}^2$$

128. The pressure exerted by man on earth is minimum when he:

(1) Sits (2) Stands on one foot

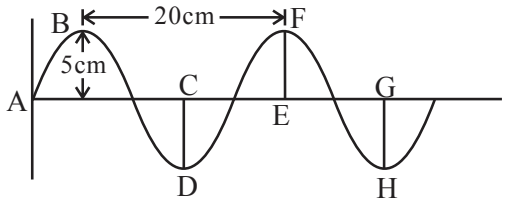
(3) Stands on both feet (4) Lies on ground

Ans. (4)

Sol. For constant force : $P \propto \frac{1}{A}$

for pressure to be minimum, area must be maximum.

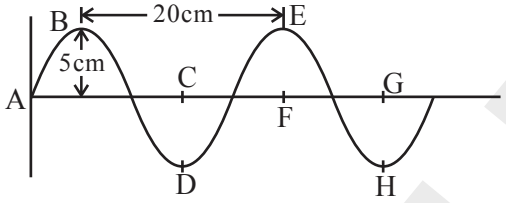
129. Waves of frequency 100 Hz are produced in a string as shown in the figure. Its amplitude, wavelength and velocity are:



(1) 20 cm, 5 cm, 20 m/s
(2) 20 cm/s, 20 cm, 5 m
(3) 20 cm, 20 cm/s, 5 cm
(4) 5 cm, 20 cm, 20 m/s

Ans. (4)

Sol.



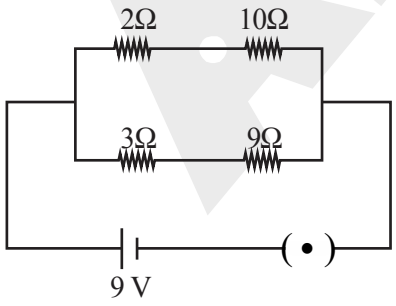
Amplitude = 5 cm

Wavelength = 20 cm

Wave speed $v = f\lambda$

$$v = 100 \times \frac{20}{100} = 20\,m/s$$

130.



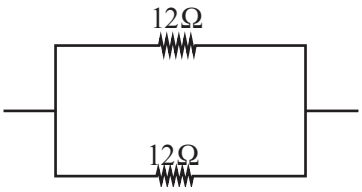
The equivalent resistance for the above circuit is:

(1) 6Ω
(2) 3Ω
(3) 9Ω
(4) 8Ω

Ans. (1)

Sol. In upper branch $10\ \Omega$ and $2\ \Omega$ are in series and

in lower branch $3\ \Omega$ and $9\ \Omega$ are in series.



$$\frac{1}{R_{eq}}=\frac{1}{R_1}+\frac{1}{R_2}$$

$$\frac{1}{R_{eq}}=\frac{1}{12}+\frac{1}{12}$$

$$R_{eq}=\frac{12}{2}=6\ \Omega$$

131. The device used to detect the levels of exposure to ionizing radiation is:

(1) Dosimeter (2) Radiometer (3) Photometer (4) Pyrometer

Ans. (1)

Sol. Dosimeter is used to detect the levels of exposure to ionizing radiation.

132. When the light travels from one medium to another medium of different refractive index, then which of the following will change?

(1) Wavelength and Speed (2) Frequency and Wavelength

(3) Frequency and Speed (4) Frequency, Wavelength and Speed

Ans. (1)

Sol. When light travels from one medium to another than frequency remains constant.

$$f=\frac{\nu}{\lambda}$$

$\therefore\ \nu$ and λ must change.

133. The e.m.f generated in D.C. generator is directly proportional to:

(1) Speed of armature (2) Strength of the magnetic field

(3) Number of turns of the coil (4) All the above

Ans. (4)

Sol. e.m.f generated in D.C. generator is directly proportional to

(1) Speed of armature.

(2) Strength of the magnetic field.

(3) Number of turns of the coil.

134. The composition of Duralumin Alloy is:

(1) Al, Mg, Mn, Cu (2) Al, Mg, Cu, Zn

(3) Mg, Mn, Cu, Ni (4) Mn, Cu, Fe, Ni

Ans. (1)

Sol. Duralumin Alloy is

$Al \rightarrow 95\%$, $Cu \rightarrow 4\%$, $Mg \rightarrow 0.5\%$, $Mn \rightarrow 0.5$.

135. IUPAC name of EPSOM salt is:

(1) Copper II sulphate pentahydrate

(2) Calcium sulphate dihydrate

(3) Magnesium sulphate heptahydrate

(4) Zinc sulphate heptahydrate

Ans. (3)

Sol. EPSOM salt $\rightarrow MgSO_4 \cdot 7H_2O$

136. $NH_4OH_{(aq)} + HNO_{3(aq)} \rightarrow NH_4NO_{3(aq)} + H_2O_{(l)}$ is a _____ reaction.

(1) Precipitation reaction (2) Combustion reaction

(3) Neutralization reaction (4) Decomposition reaction

Ans. (3)

Sol. It is a reaction between acid and base to given salt and water.

137. The symbol assigned for Azimuthal quantum number:

(1) n (2) l (3) s (4) m

Ans. (2)

Sol. Principal quantum number - n

Azimuthal quantum number - l

Magnetic quantum number - m

Spin quantum number - s

138. Pick the odd one out:

(1) $C_2H_5 - O - C_2H_5$ (2) CHI_3

(3) $CHCl_3$ (4) N_2O

Ans. (4)

Sol. N_2O is not an organic compound.

139. Pick out the **incorrect** pair(s) :

(a) $CaCO_3$ - Soluble in water

(b) CaC_2 - Greyish black solid

(c) CS_2 - White crystalline substance

(d) $NaHCO_3$ - Highly poisonous

(1) (a) and (b) only
(2) (b) and (d) only
(3) (a), (c) and (d) only
(4) (a) only

Ans. (3)

Sol. $CaCO_3 \rightarrow$ insoluble in water

$CS_2 \rightarrow$ is liquid

$NaHCO_3 \rightarrow$ It is not poisonous, it is used in baking.

140. The chemical used to identify drinkers in alcohol test :

(1) Copper sulphate
(2) Potassium dichromate
(3) Sodium carbonate
(4) Potassium permanganate

Ans. (2)

Sol. When a person who has consumed alcohol breathes into the breath analyser used by police,

$K_2Cr_2O_7$ & H_2SO_4 which is present in it reacts with alcohol and the colour changes from orange to green.

141. Silicon Carbide contains :

(1) Co-ordinate bond
(2) Ionic bond
(3) Covalent bond
(4) Hydrogen bond

Ans. (3)

Sol. In SiC, Si and C atoms form tetrahedral covalent bond.

142. Lime water has a pH value :

(1) Less than 7
(2) More than 12
(3) Zero
(4) Equal to 12

Ans. (4)

Sol. Lime water has a pH of 12.

143. Which of the following is a good oxidizing agent?

(1) $NaBH_4$ (2) Pt (3) Pd (4) $KMnO_4$

Ans. (4)

Sol. $KMnO_4$ is a good oxidising agent.

144. The number of molecules in 27 gms of H_2O is :

(1) 9.034×10^{23} (2) 18.069×10^{23}

(3) 27×10^{23} (4) 18×10^{23}

Ans. (1)

Sol. Moles of $H_2O=\frac{27}{18}=1.5$ moles

Number of molecules = $1.5\times6.022\times10^{23}$

$=9.034\times10^{23}$

145. Compound 'X' decomposes to form compound 'Y' and CO_2 gas. Compound 'Y' is used in the manufacture of cement. Identify X and Y.

(1) CaO, $CaCO_3$ (2) $CaCO_3$, CaO

(3) CaO, $Ca(OH)_2$ (4) $Ca(OH)_2$, $CaCO_3$

Ans. (2)

Sol. $\underset{X}{CaCO_3} \xrightarrow{\Delta} \underset{X}{CaO} + CO_2$

CaO is used in manufacture of cement.

146. An example for hygroscopic substance :

(1) CaO (2) NaOH (3) KOH (4) $FeCl_3$

Ans. (1)

Sol. CaO is hygroscopic. Rest all are deliquescent.

147. Match the following :

(a)	Denitrification	(i)	Uric acid
(b)	Nitrogen fixation	(ii)	Synthesize proteins
(c)	Nitrogen assimilation	(iii)	Pseudomonas
(d)	Ammonification	(iv)	Blue green algae

(1) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
(2) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)
(3) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)
(4) (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

Ans. (1)

Sol. Denitrification - Pseudomonas

Nitrogen fixation - Blue green algae

Nitrogen assimilation - Synthesize proteins

Ammonification - Uric acid.

148. Roots are absent in _____ plant.

(1) Hydrilla (2) Wolffia (3) Lotus (4) Eichhornia

Ans. (2)

Sol. Roots are absent in wolffia plant

149. The toxic substance present in seeds of apple and cherry :

(1) Ascorbic acid (2) Acetic acid (3) Amino acid (4) Prussic acid

Ans. (4)

Sol. Hydrogen cyanide, sometimes called prussic acid, is a chemical compound with the chemical formula HCN. Apple seeds (and the seeds of related plants, such as pears and cherries) contain amygdalin, a cyanogenic glycoside composed of cyanide and sugar. When metabolized in the digestive system, this chemical degrades into highly poisonous hydrogen cyanide (HCN). A lethal dose of HCN can kill within minutes.

150. Which of the following has non- lignified walls ?

(1) Collenchyma (2) Xylem vessels (3) Sclerenchyma (4) Xylem fibres

Ans. (1)

Sol. Collenchyma - non - lignified (in Collenchyma - pectin is present)

xylem vessels, sclerenchyma, xylem fibres $\rightarrow$ are lignified.

151. Oxalic acid, acetic acid and citric acid are produced by fungus :

(1) Bacillus megaterium (2) Azotobacter (3) Lactobacillus (4) Aspergillus niger

Ans. (4)

Sol. Aspergillus niger fungus (Remaining all are bacteria).

152. Which of the following statement is correct ?

(1) Virus that infect bacterial cells is called bacteriophage

(2) Bacterium that infect virus cells is called bacteriophage

(3) Virus that infect animal is called bacteriophage

(4) Bacteria that infect plant is called bacteriophage

Ans. (1)

Sol. Virus that infect bacterial cells is called bacteriophage.

153. Match the following :

(a) Pancreas	(i) Rennin
(b) Salivary gland	(ii) Lipase
(c) Intestinal gland	(iii) Ptyalin
(d) Gastric gland	(iv) Trypsin

(1) (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii)

(2) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

(3) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

(4) (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)

Ans. (2)

Sol. Pancreas - Trypsin

Salivary gland - Ptyalin

Intestinal gland - Lipase

Gastric gland - Rennin

154. _____ is an ectoparasite which has jawless, circular mouth vertebrate.

(1) Carps (2) Mullets (3) Shark (4) Hag fish

Ans. (4)

Sol. Hag fish (Myxine) belong to cyclostomata. (Agnatha. jawless fish is an ectoparasite which has jawless, circular mouth vertebrate.

155. _____ Produces fibrinogen and prothrombin used for clotting of blood.

(1) Pancreas (2) Liver (3) Intestinal gland (4) Renin

Ans. (2)

Sol. Liver produces fibrinogen and prothrombin used for clotting of blood.

156. Match the following :

(a)	Squamous epithelium	(i)	bile duct
(b)	Cuboidal epithelium	(ii)	buccal cavity
(c)	Columnar epithelium	(iii)	Kidney tubules
(d)	Ciliated epithelium	(iv)	Salivary glands

(1) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)
(2) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
(3) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)
(4) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)

Ans. (1)

Sol. Squamous epithelium - buccal cavity
Cuboidal epithelium - Salivary glands
Columnar epithelium - Bile duct
Ciliated epithelium - Kidney tubules

157. _____ are tennis racket shaped particles seen in inner mitochondrial membrane.
(1) Porin (2) ATP (3) Oxysome (4) Grana

Ans. (3)

Sol. Oxysomes $\left(f_0 - f_1 \text{ particles}\right)$ are tennis rocket shaped particles seen in inner mitochondrial membrane.

158. The _____ has a role in sleep cycle.
(1) Cerebrum (2) Spinal cord (3) Pons (4) Hypothalamus

Ans. (3)

Sol. Pons has a role in sleep cycle.

159. The binomial name of African night Crawler is _____.
(1) Eudrilus eugenias (2) Perionyx excavatus (3) Eisenia fetida (4) Peneus monodon

Ans. (1)

Sol. Binomial name of African night crawler is west African Earthworm - Eudrilus eugenial
$\rightarrow$ Perionye excavatus $\rightarrow$ Asian blue worm
$\rightarrow$ Eisenia fetida - Manure worm
$\rightarrow$ Peneus monodon - Giant tiger prawn

160. Which of the following helps in clotting of blood ?
(1) Monocytes (2) Thrombocytes (3) Lymphocytes (4) Granulocytes

Ans. (2)

Sol. Thrombocytes (platelets) helps in clotting of blood .

SOCIAL SCIENCE

161. The chronological order of four civilizations of Mesopotamia.

(1) Sumerrians - Assyrians - Akkadians - Babylonians (2) Babylonians -Sumerians - Assyrians - Akkadians
(3) Sumerians - Akkadians - Babylonians - Assyrians (4) Babylonians - Assyrians - Akkadians - Sumerians

Ans. (3)

Sol. Option (3) is a correct chronological order of four civilizations of Mesopotamia.

162. The inscriptions of _____ near Karur mention the Chera kings of three generations.

(1) Pugalur (2) Kadiyalur (3) Adichanallur (4) Arikkamedu

Ans. (1)

Sol. The inscriptions of Pugalur near Karur mention the Chera kings of three generations.

163. Roman Emperor _____ was a Contemporary of Nandhivarman II.

(1) Trajan (2) Zohn II (3) Augustus (4) Charle Magne

Ans. (4)

Sol. Roman Emperor Charle Magne was a Contemporary of Nandhivarman II.

164. The Peleponneisian war was fought between _____ and _____.

(1) Greeks and Persians (2) Plebeians and Patricians
(3) Spartans and Athenians (4) Greeks and Romans

Ans. (3)

Sol. The Peleponneisian war was fought between Spartans and Athenians.

165. The king believed in the "Divine Right theory of Kingship".

(1) Louis XIV (2) Louis XVI (3) Louis XV (4) Louis XVIII

Ans. (2)

Sol. Louis XVI, king of France believed in the "Divine Right theory of Kingship".

166. Match the following :

(a)	Prarthana Samaj	(i)	1884
(b)	Widow Marriage Association	(ii)	1870
(c)	Deccan Education society	(iii)	1861
(d)	Poona Sarvajanick Sabha	(iv)	1867

(1) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii) (2) (a) - (iv), (b) - (ii), (c) - (i), (d) - (iii)
(3) (a) - (i), (b) - (ii), (c) - (iv), (d) - (iii) (4) (a) - (i), (b) - (iii), (c) - (iv), (d) - (ii)

Ans. (1)

Sol. Option (1) is a right order of years established

167. The newspaper started by Dr. Babasaheb Ambedkar in Mumbai in the year 1920.

(1) Nava Bharath (2) The Pioneer (3) Mooknayak (4) Hindustan Times

Ans. (3)

Sol. Mooknayak was the name of the newspaper started by Dr. Babasaheb Ambedkar in Mumbai in the year 1920.

168. The direct tax paid by the third Estate during French Revolution.

(1) Tithe (2) Taille (3) Livre (4) Jizya

Ans. (2)

Sol. Taille was direct tax paid by the third Estate to nobility during the French Revolution.

169. The Rowlatt Act was otherwise called _____.

(1) Legal Act (2) Citizenship Act (3) Black Act (4) Crime Act

Ans. (3)

Sol. The Rowlatt Act was otherwise called Black Act because it restricted all basic freedoms

170. Find the odd one out

(1) M.N.Roy (2) C.R. Das (3) Abani Mukherjee (4) M.P.T. Acharya

Ans. (2)

Sol. C.R. Das was Non communist party member.

171. The first conference of Non - Aligned Movement was held at :

(1) The Hague (2) Moscow (3) Great Britain (4) Belgrade

Ans. (4)

Sol. The 1961 Belgrade Conference officially established the Non-aligned Movement.

172. Which one of the following countries was not a member of the Axis powers ?

(1) Germany (2) Japan (3) France (4) Italy

Ans. (3)

Sol. France was member of allies during the second world war.

173. Which of the following statements is incorrect about “Doctrine of Lapse”?

(1) It was started by Lord Dalhousie.

(2) The operations were carried out between 1848 and 1856.

(3) Nagpur was the first state annexed under this rule

(4) Jhansi and Sambalpur were also annexed under this rule

Ans. (3)

Sol. Satara was the first state annexed under "Doctrine of Lapse"

174. Martin Luther translated the Bible into _____ language.

(1) English (2) German (3) Hebrew (4) Italian

Ans. (2)

Sol. Martin Luther translated the Bible into German language.

175. Which among the following statement(s) is/are correct

(a) The thickness of the crust is greater below the continents than the ocean floor

(b) Core is a store house of rocks

(c) The interior part beneath the crust is called mantle.

(d) Core is the outermost and coldest layer of the Earth.

(1) (b) and (d) only (2) (a) and (c) ony (3) (a), (c) and (d) ony (4) (b) only

Ans. (2)

Sol. CORE - is hottest and filled with molten magma

176. The _____ is the most seismically and volcanically active zone in the world.

(1) North American belt (2) Alpine - Andes belt (3) Pacific Ring of fire (4) Olid Atlantic belt

Ans. (3)

Sol. The Pacific Ring of fire is the most seismically and volcanically active zone in the world.

177. The alternate heating and cooling on rounded rock surfaces leads to _____.

(1) Block disintegration (2) Exfoliation

(3) Chemical weathering (4) Oxidation

Ans. (2)

Sol. Onion Skin weathering is also known as exfoliation weathering. Onion skin weathering often occurs in hot areas.

178. _____ in India is Asia's largest fresh water oxbow lake.

(1) Lake Kanwar (2) Chilka lake (3) Sambhar lake (4) Pulicat lake

Ans. (1)

Sol. Kanwar jheel, as it is locally called, is located 22 km north-west of Begusarai town. It is Asia's largest fresh water oxbow lake.

179. Karst topography is formed due to the action of :

(1) Running water (2) Underground water (3) Glacier (4) Wind

Ans. (2)

Sol. Karst topography is formed due to the action of underground water. Karst topography is a three-dimensional landscape shaped by the dissolution of a soluble layer or layers of bedrock, usually carbonate rock such as limestone or dolomite.

180. Pick the odd one out :

(1) Drumlin (2) Arete (3) Esker (4) Moraine

Ans. (2)

Sol. Aretes are the erosional land form of glaciers.

181. The only spere which contains all clouds in the atmosphere.

(1) Mesosphere (2) Exosphere (3) Stratosphere (4) Troposphere

Ans. (4)

Sol. Troposphere contains all clouds in the atmosphere. It is also the weather making layer of atmosphere.

182. The factors responsible for ocean currents are :

(1) Earth's revolution and periodic winds (2) Earth's rotation and prevailing winds

(3) Earth's rotation and gravitational force (4) Earth's revolution and prevailing winds

Ans. (2)

Sol. Earth's rotation and prevailing winds are major forces which causes ocean currents.

183. The shortest National Highway in India.

(1) NH 47A (2) NH 47B (3) NH 45A (4) NH 45B

Ans. (1)

Sol. NH 47A is the shortest National Highway in India that links the Junction with NH 47 at Kundanoor to the town of Willington Island in Cochin It runs for a distance of 6 km (3.7 mi).

184. Match the following :

(a)	Mangrove forest	(i)	Acacia
(b)	Tropical deciduous forest	(ii)	Malabar iron wood
(c)	Tropical Thorn forest	(iii)	Wild jasmin
(d)	Tropical Evergreen forest	(iv)	Kapok

(1) (a) - (i), (b) - (iv), (c) - (ii), (d) - (iii) (2) (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

(3) (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii) (4) (a) - (iv), (b) - (ii), (c) - (i), (d) - (iii)

Ans. (3)

Sol. Only option (3) matches correctly.

185. The biggest earthern Dam in Tamil Nadu :

(1) Vaigai Dam (2) Bhavani Sagar Dam (3) Mullai Periyar Dam (4) Mettur Dam

Ans. (2)

Sol. Bhavani Sagar Dam is established on the Bhavani river in the Erode region of Tamil Nadu state.

186. The unit of Absolute humidity is expressed as :

(1) gms of water vapour /m^3 of air (2) percentage

(3) Its/m^2 (4) m^3 of air/gms of water vapour

Ans. (1)

Sol. Absolute humidity describes the water content of air and is expressed in either grams per cubic metre or grams per kilogram.

187. Find the incorrect pair :

(1)	Continental Rise	-	Submarine fans
(2)	Oceanic Deeps	-	Epicentre of the great earthquakes
(3)	Continental Slope	-	Deep canyons and trenches
(4)	Oceanic Ridge	-	Richest fishing ground

Ans. (4)

Sol. Richest fishing grounds are found in continental shelf.

188. Garo hills is located in _____.

(1) Meghalaya (2) Jharkhand (3) Odisha (4) Bihar

Ans. (1)

Sol. Garo hills is a part of purvachal Himalaya in Meghalaya state.

189. Criminal and Civil procedure belongs to _____.

(1) Union list (2) State list (3) Concurrent list (4) None of the above

Ans. (3)

Sol. Criminal and Civil procedure belongs to Concurrent list (judicial system).

190. In Tamil Nadu, Local Government Act was passed in the year _____.

(1) 1994 (2) 1998 (3) 1990 (4) 2000

Ans. (1)

Sol. Local Government Act was passed in Tamil Nadu state in 1994.

191. _____ village is called as 'Slater Village'

(1) Iruvelpattu (2) Athipattu (3) Semankudi (4) Andipatti

Ans. (1)

Sol. Iruvelpattu, the "Slater" village of Tamil Nadu that was first surveyed by the University of Madras economist, Gilbert Slater, and his students in 1916.

192. Under Article 213, Governor can promulgate _____when the State Legislative is not in session.

(1) Order (2) Ordinances (3) Proclamation (4) Declaration

Ans. (2)

Sol. Under Article 213, Governor can promulgate ordinances when the State Legislative is not in session. It is a special legislative right of governor.

193. The headquarters of BRICS is in_____

(1) Canton (2) Beijing (3) Nanking (4) Shanghai

Ans. (4)

Sol. The headquarters of BRICS is in Shanghai.

194. The first country to implement GST in 1954 was _____.

(1) USA (2) Italy (3) India (4) France

Ans. (4)

Sol. France was the first country to implement the GST in 1954.

195. The _____ schedule of Indian Constitution has recognised _____ official languages.

(1) 8^{th}, 22 (2) 7^{th}, 22 (3) 8^{th}, 14 (4) 7^{th}, 14

Ans. (1)

Sol. The 8th schedule of Indian Constitution has recognised 22 official languages. They are also known as scheduled languages.

196. The local body election, Oct. 2021 was not held in:

(1) Tenkasi (2) Kancheepuram (3) Ariyalur (4) Tiruppattur

Ans. (3)

Sol. The local body election of Oct. 2021 was not held in Ariyalur city.

197. 'The problem of the Rupee - Its origin and solution' was the thesis of :

(1) Jawaharlal Nehru (2) Sardar Vallabhabhi Patel

(3) Rajaji (4) B.R. Ambedkar

Ans. (4)

Sol. 'The problem of the Rupee - Its origin and solution' was the book written by Dr. B.R. Ambedkar.

198. Expansion of IIP :

(1) Industrial Investment Path (2) Industrial Involved Programme

(3) Index of Industrial Production (4) International Industrial Production

Ans. (3)

Sol. Expansion of IIP is Index of Industrial Production.

199. Bundestag is the parliament of :

(1) Africa (2) Germany (3) France (4) Russia

Ans. (2)

Sol. Bundestag is the official name of German parliament.

200. The Gross National Happiness (GNH) was first mentioned in the Constitution of _____.

(1) Bhutan (2) Nepal (3) Tibet (4) Myanmar

Ans. (1)

Sol. Bhutan was the first nation to introduce Gross National Happiness (GNH).