SAMPLE PAPER - SAT



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Each Question Carries One Mark.

1. Which of the following is not a type of energy source? (a) Generator (b) Solar cell (c) Rheostat (d) Battery Ans. (c) Rheostat "Generator = Mechanical Energy to Electrical Energy, Sol. Solar cell = Light energy to Electrical Energy, Battery = Chemical energy to Electrical Energy. Rheostat = Variable resistance 2. If I is the current through a wire and e is the charge of an electron, then the number of electrons crossing in t seconds will by given: (a) $\frac{\text{Ie}}{\text{t}}$ (d) $\frac{\text{lt}}{e}$ (c) $\frac{e}{It}$ (b) Ite Ans. (d) $\frac{\text{It}}{a}$ Sol. Electric current (I) = $\frac{q}{t} = \frac{ne}{t} \Rightarrow n = \frac{It}{e}$ In a hydrogen atom an electron moves in an orbit of radius 5.0×10^{-11} m with a speed of 2.2×10^6 m/sec. Find 3. the equivalent current: (Electronic charge $=1.6 \times 10^{-19}$ C) (a) 11.2 mA (b) 1.12 mA (c) 7.04×10^{-3} A (d) None of these Ans. (b) 1.12 mA $I = \frac{q}{t} = \frac{1.6 \times 10^{-19}}{\left(\frac{2\pi \times 5 \times 10^{-11}}{2.2 \times 10^6}\right)} = 1.12 \times 10^{-3} \text{ A} = 1.12 \text{ mA}.$ Sol. 4. What happens when dilute hydrochloric acid is added to Iron filings? (a) Hydrogen gas and Iron chloride is produced. (b) Chlorine gas and Iron hydroxide is produced. (c) No reaction takes place. (d) Iron salt and water is produced. Ans. (a) Hydrogen gas and Iron chloride is produced. Sol. Fe (s) + HCl (aq) \rightarrow FeCl₂ (aq) + H₂ (g). Download

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Directions (Q.5 –Q.6):

Corrosion is the degradation of metals due to its reaction with atmospheric gases like oxygen, carbon dioxide, moisture etc. Corrosion of iron is called as Rusting due to formation of rust i.e. hydrated ferric oxide ($Fe_2O_3.xH_2O$).

Corrosion processes are electrochemical in nature. In rusting, when iron atoms are exposed to an environment containing water molecules they can give up two electrons forming positively charged ions and these electrons are taken by hydrogen ions (H^+ ions) forming hydrogen atoms which further reduce dissolved oxygen. Corrosion is prevented by barrier protection (oiling, greasing etc.), by galvanization or by coating it with more active metals.

- 5. The rusting of underground iron storage tanks and pipes can be prevented or greatly reduced by connecting them to Magnesium. This is done because:
 - (a) Magnesium is more reactive than Iron and hence Mg gets oxidised instead of Iron.
 - (b) Magnesium is more reactive than Iron and hence Mg gets reduced instead of Iron.
 - (c) Magnesium does not corrode and hence it prevents Iron from being corroded as well.
 - (d) Magnesium slows down the process of rusting and thus, iron pipes work for a longer duration of time.
- Ans. (a) Magnesium is more reactive than Iron and hence Mg gets oxidised instead of Iron.
- Sol. Magnesium is electrically connected to the metal that must be protected. It gets corrode and gets oxidized and prevents the oxidation of iron and prevents it from getting corroded.
- 6. Which of the following conditions can accelerate the rate of corrosion?
 - (I) Salt water

(II) Presence of boiled or distilled water

- (III) Humid air
- (IV) By coating Iron with Zinc as Zn is more reactive than Fe.
- (a) (I) and (IV) (b) (II) and (III)

(c) (I) and (III)

(d) (I), (III) and (IV)

- Ans. (c) (I) and (III)
- Sol. As mentioned, corrosion is an electrochemical process. Salt water accelerate rusting because it is an electrolyte solution and ions are able to move freely and speed up the process of rusting. Also, more moisture content in air (humid air) will help in the corrosion of iron.
- Which of the following compounds are produced in the light reactions of photosynthesis and are necessary to drive the dark reactions of photosynthesis?
 (a) CO = 111 CO = 11 CO = 11

(a) CO₂ and H₂O (b) CO₂, H₂O and ATP (c) ATP and NADPH (d) ADP and NADP Ans. (c) ATP and NADPH

Sol. Photosynthesis occurs in two stages. In the first stage, light reactions capture the energy of light and use it to make the energy-storage molecules ATP and NADPH.

During the second stage, dark reactions use these products to reduce carbon dioxide and synthesize glucose





8. Observe the figure given below. Identify the part of leaf that will become black when dipped in iodine solution.



(a) I only

- (c) I and III only
- Ans. (c) I and III only

Sol. The part of leaf that is covered (II) will not be able to do photosynthesis, hence no starch formation and no change is seen when dipped in iodine solution.

The part of leaf that is not covered (I and III) will be able to do photosynthesis, hence starch is formed and becomes blue black when dipped in iodine solution.

(b) II only

(d) II and III only

- 9. Unlike inspiration, expiration is a passive act because no muscular contractions are involved. Expiration, however, depends on two factors. Which of the choices below lists those two factors?
 - (a) The recoil of elastic fibers that were stretched during inspiration and the inward pull of surface tension due to the film of alveolar fluid

(b) The expansion of respiratory muscles that were contracted during inspiration and the lack of surface tension on the alveolar wall

(c) The negative feedback of expansion fibers used during inspiration and the outward pull of surface tension due to alveolar fluid

- (d) Combined amount of CO_2 in the blood and air in the alveoli
- Ans. (a) The recoil of elastic fibers that were stretched during inspiration and the inward pull of surface tension due to the film of alveolar fluid
- Sol. The muscle fibres stretched during inspiration are relaxed during expiration.

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10. Consider a three-digit number with the following properties : I. If its digits in units place and tens place are interchanged, the number increases by 36; II. If its digits in units place and hundreds place are interchanged, the number decreases by 198. Now suppose that the digits in tens place and hundreds place are interchanged, Then the number. (a) increases by 180 (b) decreases by 270 (c) increases by 360 (d) decreases by 540 Ans. (d) decreases by 540 Sol. Let three digit No is 100a + 10b + cGiven 100a + 10b + c = 100a + 10c + b - 36c = b + 4b = c - 4 (i) Also given 100a + 10b + c - (100c + 10b + a + 198)99a - 99c = 198a = c + 2 (ii) : Now 100a + 10b + c - (100b + 10a + c)=90(a-b)(use (i) & (ii)) =90(c+2-c+4)= 540: value decreases by 540 Let f(x) be a quadratic polynomial with f(2)=10 and f(-2)=-2. Then the coefficient of x in f(x) is 11. (A) 1 (B) 2 (C) 3 (D) 4 Ans. (C) 3 Sol. say $f(x) = ax^2 + bx + c$ $f(x) = ax^2 + bx + c$ f(2) = 4a + 2b + c = 10f(-2) = 4a - 2b + c = -24b = 12 \Rightarrow b = 3

12. x and y are 2 different digits. If the sum of the two digit numbers formed by using both the digits is a perfect square, then value of x + y is

(A) 10 (B) 11 (C) 12

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Ans. (B) 11

Sol. The numbers that can be formed are xy and yx. Hence, (10x+y)+(10y+x)=11(x+y). If this is a perfect square then x+y=11.

13. A man's age is p% of what it was 20 years ago but q% of what he will be after 10 years. What is his present age ?

(A)
$$\frac{q}{p}$$
 (B) $\frac{p}{q}$ (C) $\frac{10(q+2p)}{p-q}$ (D) $\frac{5(q+3p)}{p-q}$
Ans. (C) $\frac{10(q+2p)}{p-q}$
Sol. Let present age be x
 $x = p\% \text{ of } (x-20)$
 $x = q\% \text{ of } (x-10)$
 $p\% \text{ of } (x-20) = q\% \text{ of } (x+10)$
 $px-20p = qx+10q$
 $x(p-q) = 10q+20p = 10(q+2p)$
 $(p-q)x = 10q+20p = 10(q+2p)$
 $x = \frac{10(q+2p)}{p-q}$
Hence, option C is correct.
14. If a and b are the zeroes of the polynomial $x^2 - 11x + 30$, Find the value of $a^3 + b^3$
(A) 134 (B) 412 (C) 256 (D) 341
Ans (D) 341
Sol. $a^3 + b^3 = (a+b)(a^2+b^2-ab) = (a+b)\{(a+b)^2-3ab\}$

Sol.
$$a^3 + b^3 = (a+b)(a^2 + b^2 - ab) = (a+b)\{(a+b)^2 - 3ab\}$$

Now $a+b = -(-11)/1 = 11$
 $ab = 30$
So, $a^3 + b^3 = 11(121-90) = 341$





If $4^{x-5+y} = 2^{x+y} \times 2^y \times 2^y 2^{x-4} - 63$, find the sum of x and y. 15. (C) 4 (A) 2 (B) 3 (D) 5 Sol. (D) 5 $4^{(x+y)-5} = 2^{2(x+y)-4} - 63$ \Rightarrow $4^{(x+y)-5} - 4^{(x+y)-2} = -63$ \Rightarrow $4^{(x+y)-2}(-63/64) = -63$ $4^{(x+y)-2} = 64$ \rightarrow $4^{(x+y)-2} = 4^3$ \Rightarrow x + y - 2 = 3· . x + y = 5....

16. **Assertion :** In 1517, the religious reformer Martin Luther wrote Ninety Five Theses criticising many of the practices and rituals of the Roman Catholic Church.

Reason : This led to a division within the Church and to the beginning of the Protestant Reformation.

Mark the option which is most suitable :

- (a) If both assertion and reason are true and reason is the correct explanation of assertion.
- (b) If both assertion and reason are true but reason is not the correct explanation of assertion.

(c) If assertion is true but reason is false.

- (d) If both assertion and reason are false.
- Ans. (a) Both assertion and reason are true and reason is the correct explanation of assertion.
- Sol. A printed copy of the Theses was posted on a church door in Wittenberg. It challenged the Church to debate his ideas. Luther's writings were immediately reproduced in large numbers and read widely. The reason thus correctly justifies the assertion.
- 17. Who developed first known printing press in Strasbourg, Germany ?
 (a) John Shelly.
 (b) John Suleiman.
 (c) Johann Guttenberg.
 (d) John S. Mill.

Ans. (c) Johann Guttenberg.

- Sol. Johannes Gutenberg is usually cited as the inventor of the printing press. Indeed, the German goldsmith's 15thcentury contribution to the technology was revolutionary — enabling the mass production of books and the rapid dissemination of knowledge throughout Europe
- 18. Which one of the following led to the print revolution in world?(a) Hand printing.(b) Manuscript writing.(c) Calligraphy.

(d) Mechanical printing.

Ans. (d) Mechanical printing.

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Sol. The shift from hand printing to mechanical printing led to the print revolution.



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19. Ans. Sol.	The number of Tamil texts printed by the Dutch Protestant missionaries by 1710 was (a) 32 Tamil texts (b) 37 Tamil texts (c) 39 Tamil texts (d) 40 Tamil texts (a) 32 Tamil texts By 1910 dutch protestant missionaries had printed 32 tamil texts. This sentence is false, because by 1710 Dutch protestant missionaries had printed 32 Tamil texts.		
20. Ans. Sol.	E.V. Ramaswamy Naicker from Madras is better known as (a) Acharya. (b) Guru. (c) Saint. (d) Periyar. (d) Periyar. E.V. Ramaswamy Naicker from Madras is better known as Periyar.		
21. Ans. Sol.	The meaning of "Calligraphy" is (a) Kind of writing (b) ancient library (c) cultural practice (d) book binding (a) kind of writing Style of writing is calligraphy, and it's mostly used for important public documents. The word calligraphy comes from two Greek words stuck together, kallos, meaning "beauty," and graphein, meaning "to write" — literally "beautiful writing."		
22. Ans. Sol.	 Who devised the Spinning Jenny? (a) Samual Luck (b) Richard Arkwright (c) James Hargreaves (d) James Watt (c) James Hargreaves The spinning jenny is a multi-spindle spinning frame, and was one of the key developments in the industrialization of weaving during the early Industrial Revolution. It was invented in 1764 by James Hargreaves in Stanhill, Oswaldtwistle, Lancashire in England. 		
23. Ans. Sol.	The fly shuttle was used for: (a) Washing (b) Weaving (c) Drying (d) Sowing (b) Weaving The flying shuttle was one of the key developments in the industrialization of weaving during the early Industrial Revolution. It allowed a single weaver to weave much wider fabrics, and it could be mechanized, allowing for automatic machine looms.		
24. Ans. Sol.	Who was a 'Jobber' ? (a) Trusted worker (b) Painter (c) Dancer (d) Soldier (a) Trusted worker Jobbers were usually employed by the industrialists to recruit the right people for work from villages out of the various job seekers.		





25.	Which among the following industriali	sts began selling cloth in India with labels on cloth bundles?
	(a) Manchester industrialists	(b) Yorkshire industrialists

- (a) Manchester industrialists (c) Lancashire industrialists
- (d) Glasgow industrialists
- Ans. (a) Manchester industrialists
- Sol. Manchester industrialists began selling cloth in India with labels on cloth bundles
- 26. Which one of the following Goddess' image was not used on imported cloth labels? (a) Kartika (b) Saraswati (c) Lakshmi (d) Durga
- Ans. (d) Durga
- Sol. Durga Goddess' image was not used on imported cloth labels.
- 27. Which of the following companies gradually gained power in the 1750s after the decline of Indian merchant's trade capacity?
 - (a) Chinese companies (b) Russian companies (c) English companies (d) European companies
- Ans. (d) European companies
- European companies gradually gained power in the 1750s after the decline of Indian merchant's trade capacity. Sol.
- 28. Which of the following two ports grew after the European companies gained power in trade? (a) Surat and Hoogly (b) Madras and Masulipatnam (c) Bombay and Calcutta
 - (d) Kandla and Visakhapatnam
- Ans. (c) Bombay and Calcutta
- Sol. Bombay and Calcutta were two ports grew after the European companies gained power in trade
- 29. **Assertion :** The cotton weavers of India flourished with the Manchester imports. **Reason :** With the American Civil War, the cotton supplies from US to Britain increased.

Mark the option which is most suitable :

- (a) If both assertion and reason are true and reason is the correct explanation of assertion.
- (b) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (c) If assertion is true but reason is false.
- (d) If both assertion and reason are false.
- Ans. (d) Both assertion and reason are false.
- Sol. Cotton weavers in India faced two problems with Manchester goods coming to India: their export market collapsed, and the local market shrank, being glutted with Manchester imports. With the American Civil War, the cotton supply to Britain from US were cut off. Britain turned to India. Thus, both assertion and reason are false.

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- 30. **Assertion :** Like the images of gods and goddesses, figures of important personages like emperors and nawabs adorned advertisements and calendars.
 - **Reason :** This was done to show the pomp and glory of the nation.

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- Mark the option which is most suitable:
- (a) If both assertion and reason are true and reason is the correct explanation of assertion.
- (b) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (c) If assertion is true but reason is false.
- (d) If both assertion and reason are false.
- Ans. (c) Assertion is true but reason is false.
- Sol. This was done to win the confidence of the buyers to buy the products. Hence the reason is false.



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