

INSTRUCTIONS

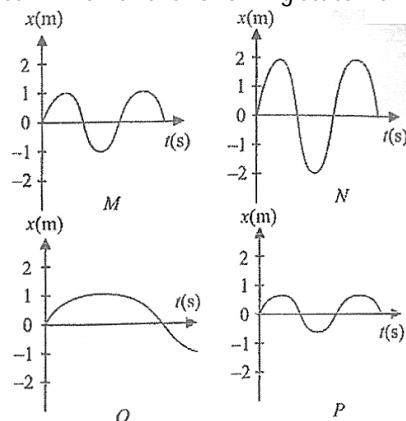
1. Immediately fill in the particulars on this page of the Test Booklet with Blue/Black Ball Point Pen. Use of pencil is strictly prohibited.
2. Test duration is TWO HOUR(120MINUTES)
3. The Test Booklet consists of 45 questions of 4 marks each. The maximum marks are 180.
4. There are four sections in the question paper.
The distribution of question, subject wise in each part is mentioned below.

PHYSICS	– 10 Questions
CHEMISTRY	– 10 Questions
BIOLOGY	– 10 Questions
MATHEMATICS	– 15 Questions
5. Candidates will be awarded Four marks (+4) each for indicated correct response of each Question& One mark (-1) deduct for indicated incorrect response. No deduction from the total score will be made if no response is indicated.
6. No candidate is allowed to carry any textual material, printed or written, bits of papers, mobile phone, any electronic device etc.
7. After the completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. However, the candidates are allowed to take away this Test Booklet with them.
8. Do not fold or make any stray marks on the Answer sheet.

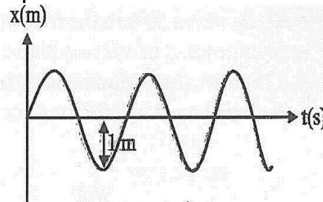
PHYSICS

1. Four sound waves M, N, O and P are shown in the figures. Which of the following statement is correct?

- (a) M and P have the same loudness
 (b) N and O have the same loudness
 (c) N and P have the same loudness
 (d) **M and O have the same loudness.**



2. A sound wave travelling in a medium is represented as shown in the figure.



If vibrating source of sound makes 360 oscillations in 2 minute, then the amplitude, wavelength and frequency of

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the sound wave are respectively (Take velocity of sound as 342 ms^{-1})

- (a) 1m, 114m and 3 Hz (b) 2m, 3m and 14 Hz (c) 1m, 5 m and 20 Hz (d) 1m, 100 m and 10 Hz

3. Read the given statements and select the correct option

Statement 1 : It is difficult to drive a vehicle at high speed on a rainy day.

Statement 2 : Friction is independent of the area of contact between the surfaces.

(a) Both statements 1 and 2 are true and statement 2 is the correct explanations of statement 1

(b) Both statement 1 and 2 are true but statement 2 is not the correct explanation of statement 1

(c) Statement 1 is true but statement 2 is false

(d) Both statement 1 and 2 are false

4. Which of the following statements are incorrect?

I. When a batsman hits a cricket ball with his bat, the force applied by the batsman is muscular force.

II. In an electric bell, the hammer strikes the gong due to electrostatic force.

III. During dry weather, hair tend to attract the comb while combing and it is due to magnetic force of attraction.

IV. Walking on ice is difficult because of lack of frictional force.

(a) I and II only

(b) I and IV only

(c) II and III only

(d) I, II and IV only

5. A cuboid has dimensions of $0.4 \text{ m} \times 0.6 \text{ m} \times 0.2 \text{ m}$ and a weight of 288 kg-f. What is the maximum pressure exerted by the cuboid?

(a) 360 kg fm^{-2}

(b) 3600 kg fm^{-2}

(c) 3.6 kg fm^{-2}

(d) $0.36 \times 10^{-2} \text{ kg fm}^{-2}$

6. An object A is placed at a distance d in front of plane mirror. If one stands directly behind the object at distance S from the mirror, then the distance of image of A from the individual is

(a) 2S

(b) 2d

(c) S + d

(d) S + 2d

7. If a plane mirror is rotated by angle 15° then the reflected light will be rotated by

(a) 15°

(b) 30°

(c) 45°

(d) 7.5°

8. We have distilled water in two plastic bottles labelled as A and B. We add hydrochloric acid to the water in bottle A and caustic soda to the water in bottle B. Which of the following will hold true?

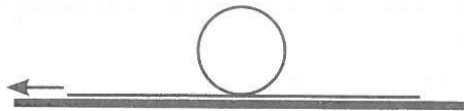
(a) The solutions in both the bottles will conduct electricity

(b) Only the solution in bottle a will conduct electricity.

(c) Only the solution in bottle B will conduct electricity.

(d) The solutions in both the bottles will not conduct electricity.

9. A ball is held on a piece of paper on a table. The paper is pulled horizontally and quickly towards left as shown in the given figure. Which one of the following statement is correct about the motion of the ball with respect to its initial position?



(a) The ball moves regardless, the presence or absence of friction between the ball and the paper.

(b) The ball moves to the left and starts rolling in the direction of applied force if there is friction between the paper and the ball.

(c) The ball moves rightwards, that is in the opposite direction in which paper pulled.

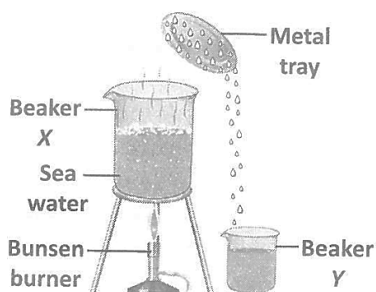
(d) The ball remains stationary regardless, the presence of absence of friction between the ball and the paper.

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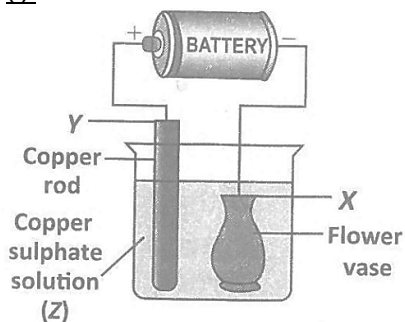
10. A ray light is incident at an angle of 30° , 45° and 60° on a boundary separating air and mediums P, Q and R respectively. The angle of refraction in these cases are 45° , 60° and 30° respectively. Which of the following statements is/are incorrect about these mediums?
- (i) The refractive index of medium Q is greater than that of medium P.
 (ii) The refractive index of medium Q is greater among all the three media.
 (iii) The refracted ray bends towards normal while going from air to medium P and moves away from normal while going from air to medium R.
- (a) (ii) only **(b) (ii) and (iii) only** (c) (i) and (iii) only (d) (i), (ii) and (iii)

CHEMISTRY

11. Chirag takes a beaker X filled with water and heats it. A metal tray is placed over beaker X and another beaker Y is positioned below the metal tray as shown in the given figure. After certain duration, some water is collected in the beaker Y. Which one of the following statements correctly explains why the rate of formation of water droplets on the metal tray decreases over the time?



- (a) As the heating continues, beaker Y loses heat and becomes cooler causing the rate of condensation to decrease.
 (b) As the heating continues, beaker Y gains heat and becomes hotter, causing the rate of condensation to decrease.
 (c) As the heating continues, the metal tray loses heat and becomes cooler, causing the rate of condensation to decrease.
(d) As the heating continues, the metal tray gains heat and becomes hotter, causing the rate of condensation to decrease.
12. The given figure shows the electroplating of copper over a flower vase made of iron. It is done by the process of electrolysis. Now, select the option that correctly fills in the given blanks in the following statement. During electrolysis, positively charged (i) ions move towards flower vase negatively charged (ii) ions move towards copper rod.



- (a) (i)-Sulphate, (ii)-Copper (b) (i)-Copper, (ii)-Sulphide
(c) (i)-Copper, (ii)-Sulphate (d) (i)-Sulphate, (ii)-Sulphide

13. Match column I with column II and select the correct option from the given codes.

Column I

- (P) Charring of sugar
(Q) Reaction of iron chloride with ammonium reaction hydroxide
(R) Burning of magnesium ribbon
(S) Reaction of zinc with Copper sulphate
(a) P-(ii), Q(iii), R-(iv), S(i)

Column II

- (i) Double-displacement Reaction
(ii) Synthesis
(iii) Decomposition reaction
(iv) Displacement reaction

- (b) P-(iv), Q(i), R-(iii), S(ii)

- (c) P-(iii), Q(i), R-(ii), S(iv)

- (d) P-(iv), Q(ii), R-(i), S(iii)

14. Read the given statements and select the correct option.

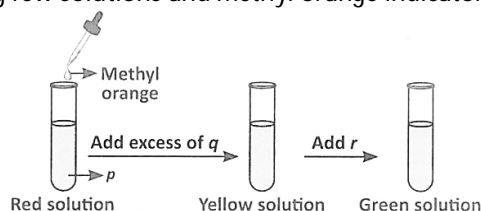
Statement 1: The chemical that are obtained from petrol are called petrochemicals

Statement 2: Petrol is used as a fuel in home and industry in the form of liquefied petroleum gas.

- (a) both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1
(b) both statement 1 and 2 are true but statement 2 is not the correct explanation of statement 1
(c) statement 1 is true but statement 2 is false
(d) both statements 1 and 2 are false.

15. Kanika performed the following experiment by taking few solutions and methyl orange indicator. Identify p, q and r in the experiment by selecting the correct option.

- (a) p-Acid, q-Base, r-China rose
(b) p-Base, q-Acid, r-Phenolphthalein
(c) p-Base, q-Acid, r-Red cabbage
(d) p-Acid, q-Base, r-Turmeric



16. Read the given statements and select the option which correctly fills the blanks in these statements.

I. Carbon particles of wax burn completely to form water vapours and carbon dioxide in the (i) zone of the candle flame.

II. Biogas is a mixture of (ii) and carbon dioxide while producer gas is a mixture of (iii) and carbon monoxide.

III. The calorific value of CNG is (iv) than that of kerosene while the calorific value of wood is (v) than that of kerosene.

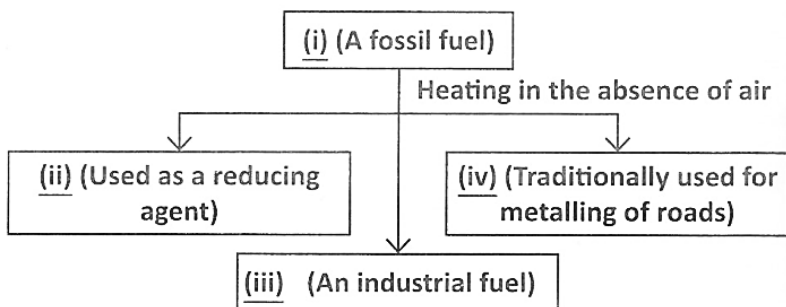
- (a) (i)-Outermost, (ii)-Methane, (iii)-Nitrogen, (iv)-Greater, (v) Lesser
(b) (i)-Middle, (ii)-Nitrogen, (iii)-Butane, (iv)-Lesser, (v)-Greater
(c) (i)-Outermost, (ii)-Methane, (iii)-Nitrogen, (iv)-Lesser, (v)-Greater
(d) (i)-Innermost, (ii)-Methane, (iii)-Nitrogen, (iv)-Lesser, (v)-Greater

17. Read the following statements and select the option that correctly identifies them as true (T) and false (f) ones.

- (i) The crude oil pumped out from a well is black liquid, hence it is called black gold.
(ii) Petroleum contains different fractions which have different boiling points
(iii) Petroleum is refined in a fractionating tower.
(iv) During refining of petroleum, the fraction with lowest boiling point condenses at the bottom of the fractionating tower.

- | | (i) | (ii) | (iii) | (iv) |
|-----|-----|------|-------|------|
| (a) | T | T | F | T |
| (b) | F | F | T | F |
| (c) | F | T | T | F |
| (d) | T | T | T | F |

18. The pH values of a few substances are listed as: P-8.6, Q-9.8, R-13.2, S-2.5, T-5.6
Based on the given data, select the correct statement(s) from the following.
- (i) Substances Q and R are acidic in nature and substance R is more acidic than substance Q.
 - (ii) Substances S and T are basic in nature and substance S is more basic than substance T.
 - (iii) Substances P, Q and R are basic in nature while substances S and T are acidic in nature.
 - (iv) Substance T changes blue litmus red while substance P changes red litmus blue.
- (a) (i) and (ii) only (b) (iii) and (iv) only **(c) (ii) and (iv) only** (d) (i) only
19. Study the given classification chart and identify (i), (ii), (iii) and (iv).



- | | (i) | (ii) | (iii) | (iv) |
|------------|-------------|---------------|-----------------|-----------------|
| (a) | Crude oil | Diesel | Petrol | Kerosene |
| (b) | Coke | Coal | Coal gas | Charcoal |
| (c) | Coal | Coke | Coal gas | Coal tar |
| (d) | Coke | Wood charcoal | Lampblack | Gas carbon |
20. Read the following statements carefully.
- (i) Burning of LPG is an example of spontaneous combustion while burning of fire crackers is an example of slow combustion.
 - (ii) Carbon dioxide is considered to be the best electrical equipment or fire caused by burning of inflammable liquids
 - (iii) The head of the safety match contains a mixture of potassium chloride, antimony trisulphide and a little red phosphorus
 - (iv) In the luminous zone of the candle flame, the wax vapours do not burn completely due to adequate supply of oxygen.
- The correct statement(s) is/are
- (a) (i), (ii) and (iv) only **(b) (ii) only** (c) (ii) and (iii) only (d) (iii) only

BIOLOGY

21. How many of the following are fungal diseases of plants?
- Citrus canker, Late blight of potato, Mosaic disease of mustard, Downy mildew of grapes, Leaf curl of cotton, Rust of wheat, Tobacco mosaic disease, Loose smut of wheat, Leaf curl of tomato
- (a) 6 (b) 7 **(c) 4** (d) 5

22. Read the given statements and select the correct option.
Statement 1: Cloning is the production of an exact copy of an animal by means of sexual reproduction.
Statement 2: Cloning produces genetically identical copies of an organism which are called clones.
(a) Both statements 1 and 2 are true and statement 2 is correct explanation of statement 1
 (b) Both statement 1 and 2 are true and statement 2 is not the correct explanation of statement 1
 (c) Statement 1 is false and statement 2 is true
 (d) Both statements 1 and 2 are false.

23. Select the correct match.

	Blood component	Function
a.	Platelets	Help in blood clotting
b.	Red blood cells	Produce antibodies to kill germs
c.	White blood cells	Combine with carbon dioxide in the blood
d.	All of these	

24. Read the following statements and select the option which correctly identifies them as true (T) and false (F) ones.
 (i) Respiration through skin is known as cutaneous respiration
 (ii) Air exhaled by us contains 0.04% of carbon dioxide
 (iii) The opening and closing of stomata in plants is carried out by contraction and expansion of guard cells
 (iv) Internal respiration is a physical process in which food molecules are oxidised to give carbondioxide and water
 (v) Plants growing in salty water possess specialised roots called pneumatophores.
- | | (i) | (ii) | (iii) | (iv) | (v) |
|------------|------------|-------------|--------------|-------------|------------|
| (a) | T | F | T | F | T |
| (b) | T | T | F | T | F |
| (c) | F | T | F | T | T |
| (d) | F | T | T | F | F. |

25. Which among the given characteristics of flowers are most likely related to insect pollinated flowers?
 (i) Small, dull and inconspicuous flowers
 (ii) Usually have nectaries to produce nectar
 (iii) Scented and brightly coloured flowers
 (iv) Small, light and dry pollen grains
 (v) Sticky stigma and pollen grains
 (a) (i), (ii) and (iv) only (b) (i), (iii) and (v) only (c) (i), (ii), (iv) and (v) only **(d) (ii), (iii) and (v) only.**

26. Refer to the given characteristics of organisms P and Q and select the option that correctly identifies them.
P: It is a multicellular, saprophytic organism which can be used to make antibiotics.
Q: It is unicellular organism that causes pneumonia.

	P	Q
a.	Paramecium	Bacteriophage
b.	Lactobacillus	Vibrio cholera
c.	Penicillium	Streptococcus
d.	Giardia	Paramecium

27. Select the incorrect match.

a.	Rennin	Breaks down proteins into peptones
b.	Bile	Activates lipase
c.	Pancreatic amylase	Changes starch into maltose
d.	Lipase	changes fats into fatty acids and glycerol

28. Refer to the given table and select the option that correctly identifies P and Q.

National Park	Famous
Kaziranga National Park	P
Q	Royal Bengal Tiger

	P	Q
a.	Asiatic lion	Gir National Park
b.	Hangul	Jim Corbett National Park
c.	Chinkara	Kanha National Park
d.	One-horned rhinoceros	Sundarbans National Park

29. Each of the following groups (P-R) contains an odd member on the basis of internal or external fertilisation.

Group P: Pigeon, Snake, Rohu, Human being

Group Q: Crocodile, Bat, Cat, Frog

Group R: Rat, Catla, Squirrel, Buffalo

Select the option that correctly identifies the odd member in each group.

	P	Q	R
a.	Snake	Crocodile	Squirrel
b.	Rohu	Frog	Catla
c.	Pigeon	Cat	Rat
d.	Human being	Bat	Buffalo

30. Which of the following statements is/are incorrect?

(i) Septic tank is an economical method of partial treatment of sewage

(ii) Common disinfectant like chlorine is used during primary treatment of wastewater in a wastewater treatment plant

(iii) Herbivores constitute the first trophic level of a food chain

(iv) The decomposers operate at all levels of a food chain

(a) (i) and (iv) only

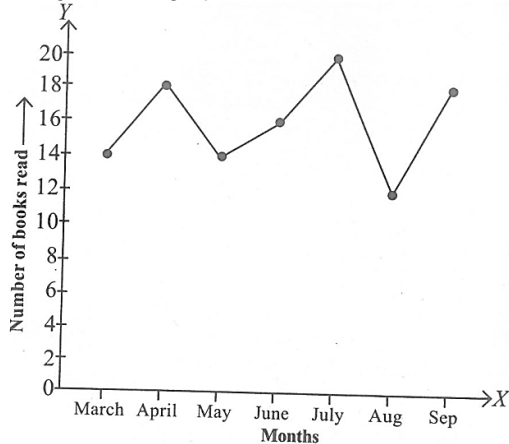
(b) (ii) only

(c) (ii) and (iii) only

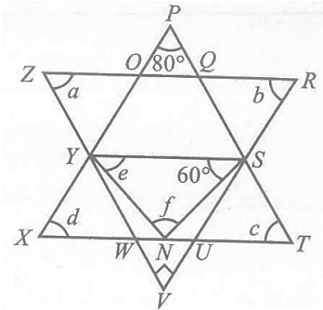
(d) (i), (iii) and (iv) only.

MATHEMATICS

31. The given line graph shows the number of books read by Shivani in 7 months.



- What is the ratio of number of books read in May and July together to the total number of books read in 7 months?
 (a) 12: 71 (b) 3: 7 (c) 17: 56 (d) 16: 7
32. Find the value of $(a + b) - (e + f) + (c + d)$, if $\angle WVU = 90^\circ$.



- (a) 90° (b) 70° (c) 200° (d) 210°
33. Arrange the steps of construction while constructing a quadrilateral $PQRS$ given that $PQ = 4.2\text{ cm}$, $PS = 3\text{ cm}$, $QR = 1.5\text{ cm}$, $\angle P = 60^\circ$ and $\angle Q = 75^\circ$.
Steps of construction:
Step 1: With Q as centre and radius 1.5 cm , cut off $QR = 1.5\text{ cm}$ along QX .
Step 2: Construct $\angle QPY = 60^\circ$ at P.
Step 3: Join RS.
Step 4: With P as centre and radius 3 cm , cut off $PS = 3\text{ cm}$ along PY .
Step 5: Draw $PQ = 4.2\text{ cm}$.
Step 6: Construct $\angle PQX = 75^\circ$ at Q.
 (a) 5, 2, 4, 1, 3, 6 (b) 5, 4, 2, 1, 6, 3 (c) 5, 2, 4, 6, 1, 3 (d) 5, 2, 4, 1, 6, 3

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34. Simplify:

$$\frac{\left(\frac{4}{3} \times \left(-\frac{25}{2}\right)\right) + \left(\left(-\frac{10}{3}\right) \times \frac{5}{2}\right) - \left(\left(-\frac{16}{3}\right) \times \left(-\frac{45}{32}\right)\right)}{\frac{3}{4} \times \left(\frac{9}{14} \times \left(-\frac{2}{18}\right)\right)}$$

(a) $13\frac{11}{27}$

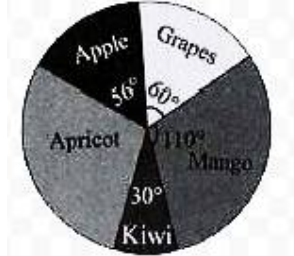
(b) $606\frac{2}{3}$

(c) $-133\frac{7}{4}$

(d) $606\frac{7}{3}$

35. There are few males and females in a meeting. If $\frac{3}{8}$ of the people in the meeting are males and there are 90 more females than males, then how many females are there in the meeting?
 (a) 135 (b) 200 (c) **225** (d) None of these.

36. The given pie chart shows the different types of fruits in a store. The total number of fruits in the store is 1080.



If a fruit is selected at random, then

- (A) Find the probability that the selected fruit is an Apricot
 (B) Find the probability that the selected fruit is a Kiwi.

	(A)	(B)
(a)	$\frac{19}{60}$	$\frac{29}{60}$
(b)	$\frac{17}{45}$	$\frac{7}{22}$
(c)	$\frac{13}{45}$	$\frac{1}{12}$
(d)	$\frac{23}{50}$	$\frac{17}{40}$

37. A number is multiplied by $2\frac{1}{3}$ times itself and then 61 is subtracted from the product obtained. If the final result is 9200, then the number is _____.
 (a) 36 (b) **63** (c) 67 (d) 37

38. Simplify:

$$\left[2x^2 - \frac{1}{400}y^2\right]^2 - \left[2x^2 + \frac{1}{400}y^2\right]^2$$

(a) $-\frac{x^2y^2}{40}$

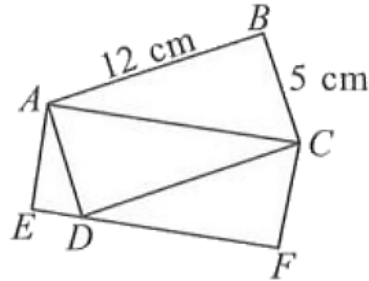
(b) $-\frac{x^2y^2}{50}$

(c) $\frac{xy}{50}$

(d) $-\frac{x^2y^2}{5}$

39. If $\sqrt[3]{3\left(\sqrt[3]{x} - \frac{1}{\sqrt[3]{x}}\right)} = 2$, then $\sqrt[3]{x} + \frac{1}{\sqrt[3]{x}} =$ _____.
- (a) $\frac{10}{3}$ (b) $\frac{1}{3}$ (c) $\frac{1}{5}$ (d) $\frac{3}{5}$
40. A man invested $\frac{2}{5}$ of his capital at 8% p.a., $\frac{3}{8}$ of his capital at 10% p.a. and the remaining at 12% p.a. If his annual income at simple interest is ₹ 965, then his capital is _____.
- (a) ₹ 8000 (b) ₹ 9000 (c) ₹ 10000 (d) ₹ 11000

41. $ABCD$ is a rectangle of dimensions 12 cm and 5 cm. $AEFC$ is rectangle drawn in such a way that the diagonal AC of the first rectangle is one of its sides and side opposite to it is touching the first rectangle at D as shown in figure. What is the ratio of the area of rectangle $ABCD$ to $AEFC$?



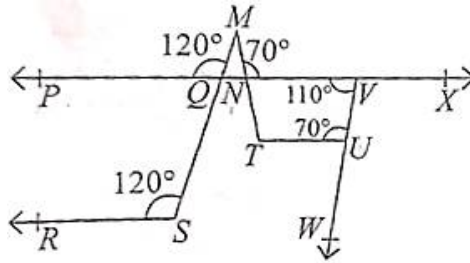
- (a) 3:1 (b) 2:3 (c) 1:1 (d) 5:4

42. Solve for x and match the following:

	Column A		Column B
(P)	$\frac{(243)^{0.13} \times (243)^{0.07}}{(7)^{0.25} \times (49)^{0.075} \times (343)^{0.2}} = \left(\frac{3}{7}\right)^x$	(i)	$x = \frac{1}{2}$
(Q)	$(256)^{0.16} \times (256)^{0.09} = 2^x$	(ii)	$x = 1$
(R)	$\frac{2^{x-1} \cdot 4^{2x+1}}{8^{x-1}} = 32$	(iii)	$x = 2$
(S)	$3^x - 3^{x-1} = 54$	(iv)	$x = 4$

- (P) (Q) (R) (S)
- (a) (i) (ii) (iii) (iv)
- (b) (ii) (iii) (i) (iv)**
- (c) (iii) (i) (ii) (iv)
- (d) (ii) (i) (iii) (iv)
43. 1000 soldiers in a fort had enough food for 20 days. But some soldiers were transferred to another fort and the food lasted for 25 days. How many soldiers were transferred?
- (a) 200 (b) 250 (c) 310 (d) None of these.
44. A 5-digit number $xy235$ is divisible by 3 such that $x + y < 5$, where x and y are single digits, then possible values of (x, y) are _____.
- (a) (1, 1) or (4, 0) **(b) (1, 1) or (2, 0)** (c) (1, 1) or (0, 2) (d) (2, 0) or (0, 2)

45. If all lines are straight lines in the given figure (not drawn to scale), then which of the following options is incorrect?



(a) $PQ \parallel RS$

(b) $\angle NVU + \angle NTU = 180^\circ$

(c) $MT \parallel VW$

(d) None of these.