

**CLASS-XII**  
**SAMPLE PAPER**  
**PAPER-1**

**PAPER CODE: A**

Reg. No. 

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*Maximum Marks : 240*

*Time allowed : 2 hours*

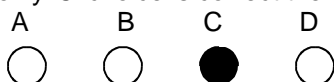
Name : \_\_\_\_\_

**Please read the instructions in Question Booklet before answering the question paper.**

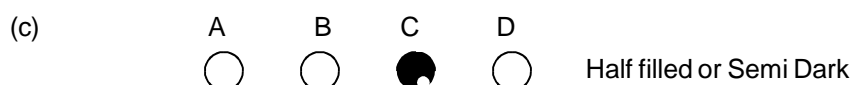
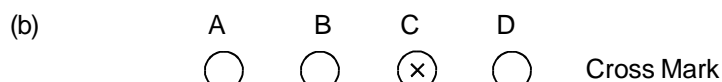
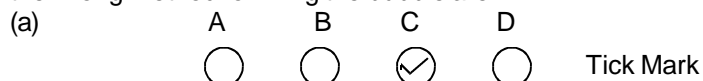
**INSTRUCTIONS**

01. The question paper has '**10**' printed pages. Please ensure that the copy of the question paper you have received contains all pages.
02. Before starting the paper, fill up the required details in the blank space provided in the answer sheet.
03. Write your name and Seven digit **Reg. No.** in the space provided at the top of this booklet.
04. The question paper consists of '**60**' objective type questions. Each question carry **4 marks** and all of them are compulsory.
05. Each question contains four alternatives out of which only **ONE** is correct.
06. There is **NEGATIVE** marking. **1 mark** will be deducted for each wrong answer.
07. Indicate the correct answer for each question by filling appropriate bubble in your answer sheet.
08. The answers of the questions must be marked by shading the circle against the question by dark **Black Ball point Pen** only.
09. For rough work, use the space provided at the bottom of each page. No extra sheet will be provided for rough work and you are not supposed to bring the same.
10. Use of **blank papers, clip boards, log tables, calculator, slide rule, mobile** or any other **electronic gadgets** in any form is "**NOT PERMISSIBLE**".
11. You must not carry mobile phone even if you have the same, give it to your Invigilator before commencement of the test and take it back from him/her after the exam.
12. The Answer Sheet will be checked through computer hence the answer of the questions must be marked by shading the circles against the question by dark **Black Ball point Pen** only.

**For example** if only 'C' choice is correct then, the correct method for filling the bubble is



the wrong method for filling the bubble are



The answer of the questions in wrong or any other manner will be treated as wrong.

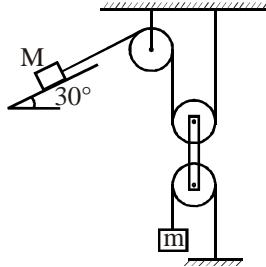
**USEFUL DATA**

**Take  $g = 10 \text{ m/s}^2$  wherever required.**

**PHYSICS**

- Q.1 Two waves each of amplitude 1.5 mm and frequency 10 Hz are travelling in opposite directions with velocity  $20 \text{ mm s}^{-1}$ . The distance in mm between adjacent nodes is  
 (1) 1 (2) 1.5 (3) 2 (4) 5.0

- Q.2 In the arrangement shown, neglect the mass of the ropes and pulley. What must be the value of  $m$  to keep the system in equilibrium? There is no friction anywhere.

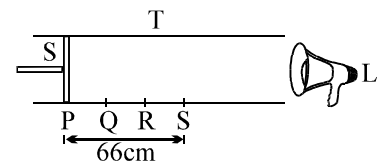


- (1) 1 (2)  $2M$  (3)  $\frac{M}{2}$  (4)  $\frac{M}{4}$

- Q.3 Units/8 The potential energy of a particle varies with distance  $x$  from a fixed origin as  $U = \frac{A\sqrt{x}}{x+B}$  where

- A and B are constants. The dimensions of AB are - [3]  
 (1)  $ML^{5/2}T^{-2}$  (2)  $M^1L^2T^{-2}$  (3)  $M^{3/2}L^{5/2}T^{-2}$  (4)  $M^1L^{7/2}T^{-2}$

- Q.4 A tube T has a tight fitting piston S at one end and a small loudspeaker L at the other end. (see figure). Nodes are detected in the air at Q, R and S, where  $AP = 66 \text{ cm}$ . If the frequency of the sound from L is then 800 Hz, the speed of sound in  $\text{ms}^{-1}$  is



- (1) 704 (2) 528  
 (3) 352 (4) 176

- Q.5 The displacement  $x$  of a particle of mass 1.0 kg moving in one dimension under the action of a force is related to time  $t$  by the equation  $t = \sqrt{x} + 5$  where  $x$  is in meter and  $t$  is in second. The magnitude of the momentum of the particle

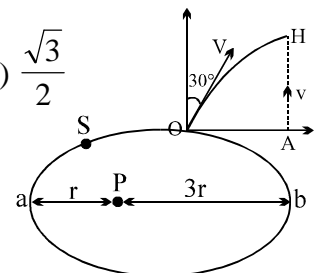
- (1) remains constant (2) increases with time  
 (3) decreases with time (4) first decreases and then increases with time

- Q.6 A particle is projected with a speed  $V$  from a point O making an angle of  $30^\circ$  with the vertical. At the same instant, a second particle is thrown vertically upward from a point A with speed  $v$ . The two particles reach H, the highest point on the parabolic path of the first particle simultaneously, then the ratio  $V/v$

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

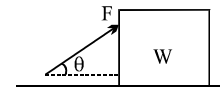
- Q.7 A satellite S moves around a planet P in an elliptical orbit. The ratio of the speed of the satellite at point a to that at point b is

- (1) 1 : 9 (2) 1 : 3  
 (3) 1 : 1 (4) 3 : 1



- Q.8 Pushing force that makes an angle  $\theta$  with the horizontal is applied on a block of weight  $W$  placed on a horizontal table. If the maximum angle of friction be  $\lambda$ , the magnitude of force required to move the body is equal to:

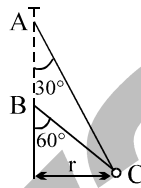
(1)  $\frac{W \cos \lambda}{\cos(\theta - \lambda)}$  (2)  $\frac{W \sin \lambda}{\cos(\theta - \lambda)}$  (3)  $\frac{W \tan \lambda}{\cos(\theta - \lambda)}$  (4)  $\frac{W \sin \lambda}{g \sin(\theta - \lambda)}$



- Q.9 An aeroplane is flying vertically upwards. When it is at a height of 1000m above the ground and moving at a speed of 367 m/s., a shot is fired at it with a speed of 567 m/s from a point directly below it. What should be the acceleration of aeroplane so that it may escape from being hit ? [3]

(1)  $>5 \text{ m/s}^2$  (2)  $>10 \text{ m/s}^2$  (3)  $<10 \text{ m/s}^2$  (4) Not possible

- Q.10 A single wire ACB passes through a smooth ring at C which revolves at a constant speed in the horizontal circle of radius  $r$  as shown in the fig. The speed of revolution is [3]



(1)  $\sqrt{rg}$  (2)  $\sqrt{2rg}$  (3)  $2\sqrt{2rg}$  (4)  $2\sqrt{rg}$

- Q.11 Three identical light uniform rods are each acted on by two or more forces, all perpendicular to the rods. Which of the rods could be in static equilibrium if the magnitudes of the forces were suitably adjusted (but not made zero)?



(1) Only 1 (2) Only 3 (3) Only 1 and 2 (4) Only 1 and 3

- Q.12 A ship floating in clear water of density  $1000 \text{ kg m}^{-3}$ , moves to sea water of density  $1050 \text{ kg m}^{-3}$  where it floats again. The upthrust on the ship then

(1) stays constant (2) decreases (3) increases (4) increases by 0.05 times

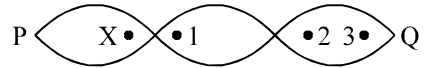
- Q.13 A particle of mass 10 gm moves in a field where potential energy per unit mass is given by expression  $v = 8 \times 10^4 x^2 \text{ erg/gm}$ . If the total energy of the particle is  $8 \times 10^7 \text{ erg}$  then the relation between  $x$  and time  $t$  is :

(1)  $x = 10 \sin(400t + \phi) \text{ cm}$  (2)  $x = \sin(400t + \phi) \text{ m}$   
 (3)  $x = 10 \sin(40t + \phi) \text{ cm}$  (4)  $x = 100 \sin(4t + \phi) \text{ m}$  [ $\phi = \text{constant}$ ]

- Q.14 Wires X and Y are made from the same material. X has twice the diameter and three times the length of Y. If the elastic limits are not reached when each is stretched by the same tension, the ratio of energy stored in X to that in Y is

(1) 2 : 3 (2) 3 : 4 (3) 3 : 2 (4) 6 : 1

- Q.15 Figure shows a stationary wave between two fixed points P and Q. Which point(s) of 1, 2 and 3 are in phase with the point X?
- (1) 1, 2 and 3  
 (2) 1 and 2 only  
 (3) 3 only  
 (4) 1 only

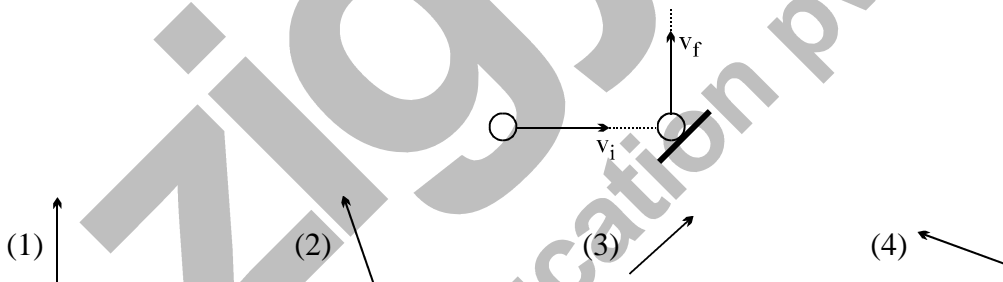


- Q.16 A particle of mass  $m = 5$  is moving with a uniform speed  $v = 3\sqrt{2}$  in the XOY plane along the line  $Y = X + 4$ . The magnitude of the angular momentum about origin is:
- (1) zero  
 (2) 7.5 units  
 (3)  $40\sqrt{2}$  units  
 (4) 60 units

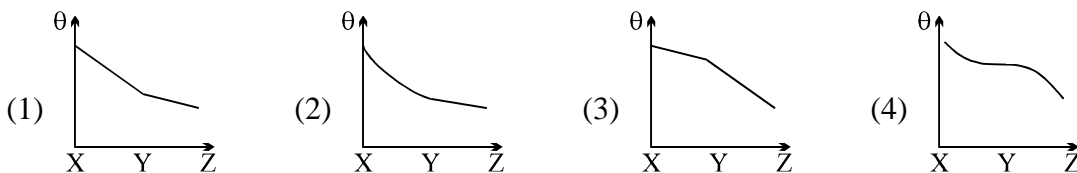
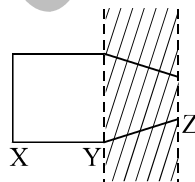
- Q.17 Spheres P and Q are uniformly constructed from the same material which is good conductor of heat and the radius of Q is twice the radius of P. The rate of fall of temperature of P is  $x$  times that of Q when both are at the same surface temperature. The value of  $x$  is
- (1)  $\frac{1}{4}$   
 (2)  $\frac{1}{2}$   
 (3) 2  
 (4) 4

- Q.18 A solar furnace has a concave mirror of collecting area  $0.8 \text{ cm}^2$ . The average thermal radiation from the Sun reaching the earth is about  $750 \text{ W m}^{-2}$ . A small mass  $0.5 \text{ kg}$ , specific heat capacity  $2000 \text{ J kg}^{-1} \text{ K}^{-1}$ , is heated by the furnace from  $10^\circ\text{C}$  to  $40^\circ\text{C}$ . The time taken in seconds for the heating is
- (1) 100  
 (2) 60  
 (3) 50  
 (4) 30

- Q.19 A ball moves horizontally from left to right with a velocity  $v_i$  and is then struck by a stick. After leaving the stick, the ball moves vertically with a velocity  $v_f$  which is smaller in magnitude than  $v_i$ . Which of the following vectors best represents the direction of the average force that the stick exerts on the ball?



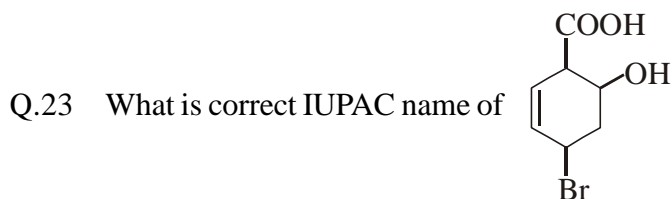
- Q.20 Heat flows through the bar XYZ in figure (a), the ends X and Z being maintained at fixed temperatures (temperature at X > temperature at Z). If only the part YZ is lagged, which graph in figure (b) shows the variation of temperature ( $\theta$ ) with distance along XZ for steady state condition?



## CHEMISTRY

- Q.21 Molecular mass is defined as the  
 (1) mass of one atom compared with the mass of one molecule  
 (2) mass of one atom compared with the mass of one atom of hydrogen  
 (3) mass of one molecule of any substance compared with the mass of one atom of C-12  
 (4) None of the above

- Q.22<sub>476/PP</sub> Which of the following represents a correct sequence of electronegativity values?  
 (1)  $F > N > O > C$  (2)  $F > N < O < C$  (3)  $F > N < O > C$  (4)  $F > N > C > O$



- (1) 4-Bromo-2-hydroxy cyclohex-5-ene-1-oic acid  
 (2) 4-Bromo-2-hydroxy cyclohex-5-ene-1-carboxylic acid  
 (3) 4-Bromo-6-hydroxy cyclohex-2-ene-1-carboxylic acid  
 (4) 4-Bromo-6-hydroxy cyclohex-2-ene-1-oic acid

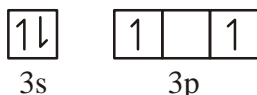
- Q.24 The percentage of copper and oxygen in samples of CuO obtained by different methods were found to be the same. This illustrates the law of :  
 (1) constant proportions (2) conservation of mass  
 (3) multiple proportions (4) reciprocal proportions

- Q.25 Which of the following order is **incorrect**.  
 (1) Electron affinity :  $N < C < O < F$  (2) Electron affinity :  $Cl > F > Br > I$   
 (3) Ionisation energy :  $P > N > O > Cl$  (4) Ionisation energy :  $IE_2(Na) > IE_2(Mg)$

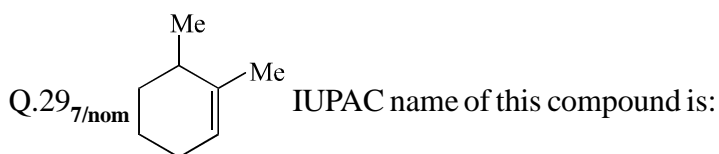
- Q.26 How many 2°, 3° and 4° carbon atoms present in isooctane  
 (1) 1, 1, 4 (2) 1, 4, 1 (3) 4, 1, 1 (4) 1, 1, 1

- Q.27 Empirical formula of a compound is  $CH_2O$ . Its molecular mass is 60. The molecular formula will be :  
 (1)  $CH_2O$  (2)  $C_2H_4O_2$  (3)  $C_3H_6O_3$  (4) None of these

- Q.28 In following electronic configuration which of the following rule is violated.



- (1) Aufbau's principle (2) Hund's rule  
 (3) Pauli's principle (4) None of these



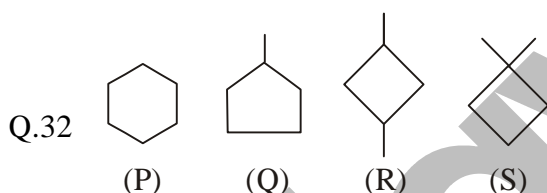
- (1) 1,2-dimethyl cyclohex-2-ene                      (2) 1,2-dimethyl cyclohex-1-ene  
 (3) 2,3-dimethyl cyclohex-1-ene                      (4) 1,6-dimethyl cyclohex-1-ene

Q.30 Which of the following statements is incorrect for cathode rays?

- (1) They move in straight line  
 (2) Their nature depends upon the nature of gas present in the discharge tube  
 (3) The cast shadow of solid objects placed in their path  
 (4) They get deflected towards positive charge

Q.31 Comment on the electronegativity (E.N.) of P in  $\text{PF}_3$  and  $\text{PF}_5$ .

- (1) Electronegativity of  $\text{P}(\text{PF}_3) >$  Electronegativity of  $\text{P}(\text{PF}_5)$   
 (2) Electronegativity of  $\text{P}(\text{PF}_3) <$  Electronegativity of  $\text{P}(\text{PF}_5)$   
 (3) Electronegativity of P is identical in both cases  
 (4) No comment can be predicted



Correct order of Boiling points of the above compounds is

- (1)  $\text{P} > \text{Q} > \text{R} > \text{S}$             (2)  $\text{P} > \text{Q} > \text{S} > \text{R}$             (3)  $\text{R} > \text{S} > \text{Q} > \text{P}$             (4)  $\text{S} > \text{R} > \text{Q} > \text{P}$

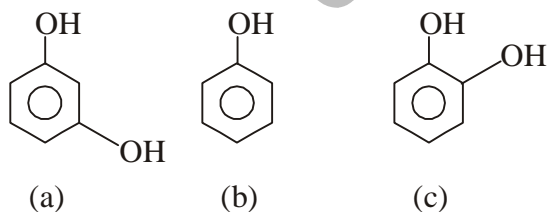
Q.33 Which of the following has a charge of +1 and a mass of 1amu ?

- (1) A neutron            (2) A proton            (3) An electron            (4) A helium nucleus

Q.34 Which of the following orbital is having longest lobe.

- (1) 3p            (2) 3d            (3) 2p            (4) 4d

Q.35 What is the correct order of solubility of the following compounds in  $\text{H}_2\text{O}$ ?



- (1)  $\text{a} > \text{b} > \text{c}$             (2)  $\text{a} > \text{c} > \text{b}$             (3)  $\text{b} > \text{a} > \text{c}$             (4)  $\text{c} > \text{a} > \text{b}$

Q.36 Which of the following describes an isotope with a mass number of 99 that contains 56 neutrons in its nucleus?

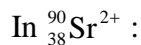
- (1)  ${}^{99}_{56}\text{Ba}$             (2)  ${}^{43}_{56}\text{Ba}$             (3)  ${}^{98}_{43}\text{Tc}$             (4)  ${}^{56}_{43}\text{Tc}$

Q.37 What will be the hybridisation of anionic part of solid  $\text{PCl}_5$ ?  
 (1)  $\text{sp}^3$  (2)  $\text{sp}^3\text{d}^2$  (3)  $\text{sp}^3\text{d}$  (4)  $\text{sp}^2$

Q.38 Solubility in  $\text{H}_2\text{O}$  will be maximum for



Q.39 Consider the following statements :



(a) atomic number is 36

(b) number of electrons is 38

(c) number of neutrons is 52

(d) number of protons is 38

Which of these are correct ?

(1) (a) and (b)

(2) (b) and (c)

(3) (c) and (d)

(4) (a) and (d)

Q.40 Structure of ammonia is :

(1) pyramidal

(2) tetrahedral

(3) trigonal planar

(4) None of these

### MATHEMATICS

Q.41 If the quadratic equations  $3x^2 + ax + 1 = 0$  and  $2x^2 + bx + 1 = 0$  have a common root, then the value of the expression  $5ab - 2a^2 - 3b^2$  is

(A) 0

(B\*) 1

(C) -1

(D) 2

Q.42 General solution of the equation  $|\cos x| = \sin x$ , is

(A\*)  $n\pi + (-1)^n \frac{\pi}{4}$

(B)  $2n\pi \pm \frac{\pi}{4}$

(C)  $n\pi + \frac{\pi}{4}$

(D)  $2n\pi + \frac{\pi}{4}$

where  $n \in \mathbb{I}$

Q.43 In a  $\Delta ABC$  if  $b + c = 3a$  then  $\cot \frac{B}{2} \cdot \cot \frac{C}{2}$  has the value equal to :

(1) 4

(2) 3

(3) 2

(4) 1

Q.44 The number of words which can be formed using all the 16 letters of the word 'SACHINRTENDULKAR' which contains the word 'ACHREKAR' and the word 'ACHREKAR' occupy among the first ten positions only, is

(A)  $\frac{9!}{2!}$

(B\*)  $12 \cdot 7!$

(C)  $24 \cdot 7!$

(D)  $(126)7!$

Q.45 Let  $S = \frac{3}{2} + \frac{3}{6} + \frac{3}{12} + \frac{3}{20} + \dots \infty$  then S is equal to

(1) 1

(2) 2

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

(4) 3

- Q.46 The value of  $x$  if  $\sqrt{x^2 + \sqrt{x^2 + \sqrt{x^2 + \dots}}} = 9$ , is  
 (A\*)  $6\sqrt{2}$  (B)  $3\sqrt{10}$  (C)  $3\sqrt{6}$  (D)  $2\sqrt{6}$
- Q.47 The distance from the centre of the circle  $x^2 + y^2 = 2x$  to the straight line passing through the points of intersection of the two circles  $x^2 + y^2 + 5x - 8y + 1 = 0$ ,  $x^2 + y^2 - 3x + 7y - 25 = 0$  is :  
 (1) 1 (2) 2 (3) 3 (4) none
- Q.48 If (1,4) is the centroid of a triangle and its two vertices are (4,-3) and (-9,7) then the third vertex is  
 (A) (7, 8) (B) (8, 7) (C\*) (8, 8) (D) (6, 8)
- Q.49 If  $y = 2x + c$  is a diameter to the circle  $2(x^2 + y^2) + 3x + 4y - 1 = 0$ , then  $c$  equals  
 (1) 0 (2) 1 (3) 2 (4)  $1/2$
- Q.50 Greatest term in the binomial expansion of  $(a + 2x)^9$  when  $a = 1$  &  $x = \frac{1}{3}$  is :  
 (A) 3<sup>rd</sup> & 4<sup>th</sup> (B\*) 4<sup>th</sup> & 5<sup>th</sup> (C) only 4<sup>th</sup> (D) only 5<sup>th</sup>
- Q.51 In an acute angled triangle ABC, if  $\frac{\tan A}{2} = \frac{\tan B}{3} = \frac{\tan C}{5}$  then  $\angle ABC$  is equal to  
 (A\*)  $\frac{\pi}{3}$  (B)  $\frac{\pi}{6}$  (C)  $\frac{\pi}{4}$  (D)  $\frac{\pi}{8}$   
 [Note : All symbols used have usual meaning in triangle ABC.]
- Q.52 Number of ways in which three distinct numbers can be selected between 1 and 20 both inclusive, whose sum is even is  
 (1) 120 (2) 450 (3) 570 (4) none
- Q.53 Points  $(t-1, 2t+2)$  and  $(2t+1, t+1)$  are images of each other with respect of line 'L'. If 'L' passes through  $(-1, 0)$  then value of 't' is  
 (A)  $\frac{1}{2}$  (B)  $\frac{3}{2}$  (C)  $\frac{-3}{2}$  (D\*)  $\frac{-1}{2}$
- Q.54 If  $\theta$  is acute angle of intersection of the curves  $x^2 + y^2 = 8$  and  $x^2 = 2y$  then  $\theta$  equals  
 (1)  $\tan^{-1}2$  (2)  $\tan^{-1}3$  (3)  $\tan^{-1}1$  (4)  $\frac{\pi}{2}$
- Q.55 The equation of line inclined at an angle  $120^\circ$  with  $x$ -axis and whose distance from origin equal 7, is  
 (A\*)  $\sqrt{3}x + y = 14$  (B)  $\sqrt{3}x - y = 14$  (C)  $3x + 4y + 35 = 0$  (D)  $-\sqrt{3}x + y + 14 = 0$
- Q.56 If  $(201)!$  is divided by  $24^k$  then the largest value of  $k$  is  
 (A) 98 (B\*) 65 (C) 49 (D) 66
- Q.57 Let  $a_r$  be the  $r^{\text{th}}$  term of an A.P. If  $a_{11} = 45$  then the common difference that would make the value of  $a_2 a_6 a_{11}$  least is equal to  
 (1) 14 (2) 7 (3) 4 (4) 3



- Q.58 The coefficient of the  $x^2y^3z^2$  term in the expansion of  $(x + y + 2z)^7$ , is  
(A\*) 840 (B) 420 (C) 210 (D) 180
- Q.59 The product of all the real solution(s) of the equation  $2 \log_9(x - 1) = 2 + \log_{(x-1)}^2 3 - \log_{\sqrt{3}}(x - 1)$  is  
(1) 3 (2) 4 (3) 40 (4)  $\frac{4}{3}$
- Q.60 The value of  $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ$  is equal to  
(A)  $\frac{1}{2}$  (B) -1 (C\*) 0 (D) 1

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### ANSWER KEY

1.	1	2.	3	3.	4	4.	3	5.	4	6.	3	7.	4
8.	2	9.	2	10.	1	11.	2	12.	1	13.	1	14.	2
15.	3	16.	4	17.	3	18.	3	19.	4	20.	4	21.	3
22.	3	23.	3	24.	1	25.	3	26.	4	27.	2	28.	4
29.	4	30.	2	31.	2	32.	1	33.	2	34.	4	35.	2
36.	3	37.	2	38.	3	39.	3	40.	1	41.	1	42.	1
43.	3	44.	2	45.	4	46.	1	47.	2	48.	3	49.	4
50.	2	51.	1	52.	3	53.	4	54.	2	55.	1	56.	2
57.	2	58.	1	59.	2	60.	3						

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