



# VIBRANT ACADEMY

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### SAMPLE PAPER (EDGE-X COURSE-2016-17)

Time : 2 Hours

Maximum Marks : 240

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

#### INSTRUCTIONS

- (i) The question paper has 20 printed pages excluding Answer Sheet. Please ensure that the copy of the question paper you have received contains all pages.
- (ii) The question paper contains 60 questions. Each question carry 4 marks and all of them are compulsory.  
**There is negative marking. One mark will be deducted for each wrong answer. No mark will be deducted for unattempted question.**
- (iii) Each question contains four alternatives out of which only **ONE** is correct.
- (iv) Indicate the correct answer for each question by filling appropriate bubble in your answer sheet.
- (v) For rough work, use the space provided at the bottom of each page. No extra sheet will be provided for rough work.
- (vi) Use of Calculator, Log Table, Slide Rule and Mobile is not allowed.
- (vii) The answer(s) of the questions must be marked by shading the circles against the question by dark pencil only. For example if only 'B' choice is correct then,

the correct method for filling the bubble is

A	B	C	D
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

the wrong method for filling the bubble are

(a)	A	B	C	D
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(b)	A	B	C	D
	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

(c)	A	B	C	D
	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

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

Name of the candidate

Regn. Number

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I have read all the instructions and shall abide by them.

I have verified all the information filled in by the candidate.

.....  
Signature of the Candidate

.....  
Signature of the invigilator

**PART I : MATHEMATICS**  
**Single Correct Choice Type**

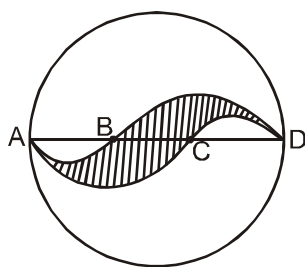
This part contains 20 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

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1. The number 111 111 111 111 is divisible by :  
(A) 5 and 11                      (B) 9 and 11                      (C) 3 and 9                      (D) 3 and 11
2. If 'p' is an integer greater than 3, then on dividing  $p^{11} + 1$  by  $p - 1$ , we would get the remainder as :  
(A) 2                      (B) 0                      (C) -2                      (D) -1
3. If  $\frac{x-a}{b+c} + \frac{x-b}{c+a} + \frac{x-c}{a+b} = 3$ , then the value of x is  
(A) abc                      (B)  $\frac{1}{abc}$                       (C)  $a + b + c$                       (D)  $\frac{1}{a+b+c}$
4. If  $p + q = 2$ , then the value of  $p^3 + q^3 + 6p^2 + 5q^2 + 6pq$  is  
(A) 19                      (B) 18                      (C) 15                      (D) 23
5. If m is any positive integer, then the last two digits in the expression  $(81)^m (121)^m - 1$  are  
(A) 02                      (B) 12                      (C) 21                      (D) 00
6. If  $a = x(y - z)$ ,  $b = y(z - x)$  and  $c = z(x - y)$  What is the value of  $\frac{xyz}{abc} \left( \frac{a^3}{x^3} + \frac{b^3}{y^3} + \frac{c^3}{z^3} \right)$  ?  
(A) 3                      (B) 4                      (C) 5                      (D) 1
7. If  $x = a(b - c)$ ;  $y = b(c - a)$ ;  $z = c(a - b)$ , then  $\left(\frac{x}{a}\right)^3 + \left(\frac{y}{b}\right)^3 + \left(\frac{z}{c}\right)^3$  is equal to  
(A)  $\frac{xyz}{abc}$                       (B)  $\frac{1}{3} \frac{xyz}{abc}$                       (C)  $3 \frac{xyz}{abc}$                       (D)  $\frac{3(x+y+z)}{(abc)}$
8. The value of  $\frac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$  is equal to  
(A) 1.5                      (B) 2/3                      (C) 2                      (D) 4
9. The value of  $\frac{6^{n+3} - 32 \times 6^{n+1}}{6^{n+2} - 2 \cdot 6^{n+1}}$  is equal to  
(A) 36                      (B) 1/6                      (C) 2                      (D) 1
10. If  $M = \frac{x_1 + x_2 + \dots + x_{20}}{20}$ , then the value of  $\sum_{i=1}^{20} \frac{(x_i - M)}{20}$  is  
(A)  $\frac{19M}{20}$                       (B) 1                      (C) 0                      (D) 1/20



20. In the given figure B and C are points on the diameter AD of the circle such that  $AB = BC = CD$ . Then find the ratio of the shaded portion to that of the whole circle.



- (A) 1 : 3                      (B) 2 : 3                      (C) 1 : 2                      (D) None of these

## PART II : CHEMISTRY

### Single Correct Choice Type

This part contains 15 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

21. During summer, water kept in an earthen pot becomes cool because of the phenomenon of :  
 (A) Diffusion                      (B) Transpiration                      (C) Osmosis                      (D) Evaporation
22. On addition of common salt in water, the boiling point of solution becomes :  
 (A) greater than water                      (B) less than water  
 (C) equal to water                      (D) any case is possible
23. Which of the following statements do not express the properties of a solid ?  
 (i) The particles of a solid have high energy.  
 (ii) The interparticle forces of attraction in a solid are very weak.  
 (iii) A solid melts at a fixed temperature  
 (iv) The viscosity of a solid is very high  
 (A) (i) and (ii) only                      (B) (i), (ii) and (iv)                      (C) (ii) and (iii) only                      (D) (iii) and (iv) only
24. Concentration of a solution in volume percent made when 40 gm of water is mixed with 0.16 L of ethanol.  
 (A) 80%                      (B) 40%                      (C) 20%                      (D) 10%
25. g-atom of mercury in 1L of the metal ?  
 (Atomic mass of Hg = 200, density of Hg = 13.6 g/cm<sup>3</sup>)  
 (A) 68                      (B) 86                      (C) 34                      (D) 43
26. The molecular formula of ethanoic acid is CH<sub>3</sub>COOH. Its empirical formula is  
 (A) C<sub>4</sub>H<sub>8</sub>O<sub>2</sub>                      (B) CH<sub>2</sub>O                      (C) CHO                      (D) CHO<sub>2</sub>
27. Natural chlorine consists of two isotopes 75% of <sup>35</sup><sub>17</sub>Cl and 25% of <sup>37</sup><sub>17</sub>Cl. Average atomic mass of chlorine :  
 (A) 35                      (B) 37                      (C) 36.5                      (D) 35.5
28. Elements having the same number of valence electrons in their atoms have similar :  
 (A) combining capacities                      (B) Chemical properties  
 (C) atomic sizes                      (D) metallic characters
29. Which one of the following reduces the penetration of ultraviolet radiation into the earth's surface ?  
 (A) Methane                      (B) Helium                      (C) Carbon dioxide                      (D) Ozone

30. For an element with atomic number 19, the 19<sup>th</sup> electron will occupy.  
 (A) L-shell (B) M-shell (C) N-shell (D) K-shell
31. Under conditions of fixed temperature and amount of gas, Boyle's law requires that  
 (i)  $P_1V_1 = P_2V_2$  (ii)  $PV = \text{constant}$  (iii)  $\frac{P_1}{P_2} = \frac{V_2}{V_1}$   
 (A) (i) only (B) (i) & (iii) only (C) (ii) only (D) (i), (ii) & (iii)
32. The smell of perfume spreads out by a process known as  
 (A) Evaporation (B) Diffusion (C) Condensation (D) Fusion
33. Which of the following is an element ?  
 (A) Marble (B) Graphite (C) Washing soda (D) stone
34. Valency shows by an element having 7 protons and 8 neutrons.  
 (A) 3 (B) 5 (C) 7 (D) 1
35. Which of the following pairs of gases contain same number of molecules ?  
 (A) 11g CO<sub>2</sub>, 7 g N<sub>2</sub> (B) 44 g CO<sub>2</sub>, 14 g N<sub>2</sub>  
 (C) 22 g CO<sub>2</sub>, 28 g N<sub>2</sub> (D) 71 g Cl<sub>2</sub>, 24 g O<sub>3</sub>

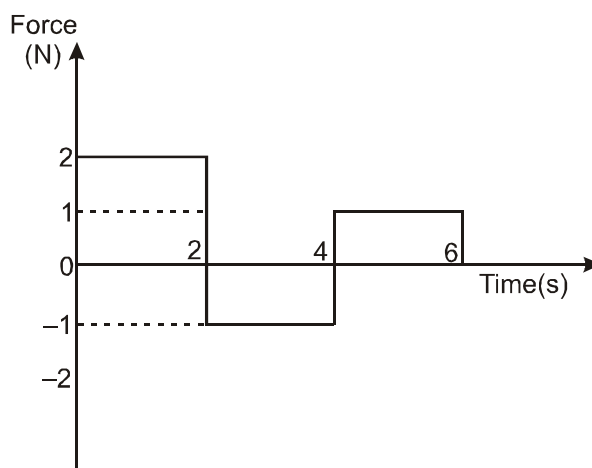
### PART III : PHYSICS

#### Single Correct Choice Type

This part contains 15 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

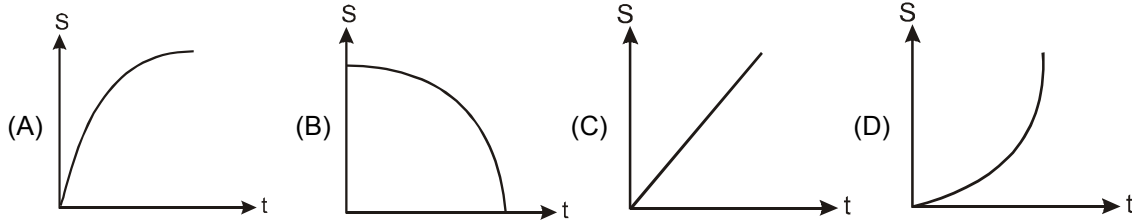
36. A particle experiences constant acceleration for 20 s after starting from rest. If it travels a distance  $X_1$ , in the first 10 s and distance  $X_2$ , in the remaining 10s, then which of the following is true ?  
 (A)  $X_1 = 2X_2$  (B)  $X_1 = X_2$  (C)  $X_1 = 3X_2$  (D) none of these
37. A stationary ball weighing 0.25 kg acquires a speed of 10 m/s when hit by a hockey stick. The impulse imparted to the ball is  
 (A) 2.5 N s (B) 2.0 N s (C) 1.5 N s (D) 0.5 N s
38. A number of discs, each of momentum  $M$  kg m/s are striking a wall at the rate of  $n$  discs per minute. The force associated with these discs, in newtons, would be  
 (A)  $\frac{Mn}{60}$  (B)  $60 Mn$  (C)  $\frac{M}{60n}$  (D)  $\frac{n}{60M}$
39. A bullet of mass  $A$  and velocity  $B$  is fired into a block of wood of mass  $C$ . If loss of any mass and friction be neglected, the velocity of the system must be  
 (A)  $\frac{AB}{A+C}$  (B)  $\frac{A+C}{B+C}$  (C)  $\frac{AC}{B+C}$  (D)  $\frac{A+B}{AC}$
40. Two skaters A and B of mass 50 kg and 70 kg respectively stand facing each other 6 metres apart. They then pull on a light rope stretched between them. How far has each moved when they meet ?  
 (A) Both have moved 3 metres. (B) a moves 2.5 metres and B moves 3.5 metres.  
 (C) a moves 3.5 metres and B moves 2.5 metres. (D) a moves 2 metres and B moves 4 metres.

41. A body floats with  $\frac{1}{3}$  rd of its volume outside water and  $\frac{3}{4}$  th of its volume outside liquid, then the density of the liquid is  
 (A)  $\frac{3}{8}$  g/cc (B)  $\frac{8}{3}$  g/cc (C)  $\frac{9}{4}$  g/cc (D)  $\frac{4}{9}$  g/cc
42. When the momentum of a body increases by 100%, its K.E. increases by  
 (A) 20% (B) 40% (C) 100% (D) 300%
43. Choose the correct statement :  
 (A)  $\alpha : \beta : \gamma :: 1 : 3 : 2$  (B)  $\alpha : \beta : \gamma :: 3 : 2 : 1$  (C)  $\alpha : \beta : \gamma :: 2 : 3 : 1$  (D)  $\alpha : \beta : \gamma :: 1 : 2 : 3$
44. A block of wood is floating on water at  $0^\circ\text{C}$ , with a certain volume V above water level. The temperature of water is slowly raised from  $0^\circ\text{C}$ . How will the volume V change with the rise of temperature ?  
 (A) V will be unchanged (B) V will decrease from  $0^\circ\text{C}$   
 (C) V will decrease till  $4^\circ\text{C}$  and then increase (D) V will increase till  $4^\circ\text{C}$  and then decrease
45. M g of ice at  $0^\circ\text{C}$  is to be converted to water at  $0^\circ\text{C}$ . If L is the latent heat of fusion of ice, the quantity of heat required for the above operation would be  
 (A) ML cal (B)  $\frac{M}{L}$  (C)  $\frac{L}{M}$  cal (D) none of these
46. A pendulum having a period of oscillation of 2 seconds is taken on a planet where g is four times that on the earth. The period of the pendulum would be  
 (A) 2 s (B) 1 s (C) 4 s (D)  $2\sqrt{2}$  s
47. A force-time graph for a linear motion is shown in figure. The linear momentum gained between 0 and 6 second is



- (A) 2 Ns (B) 4 Ns (C) 6 Ns (D) zero
48. A body of mass 2 kg collides with a wall with speed  $100 \text{ ms}^{-1}$  and rebounds with same speed. If time of contact was  $\frac{1}{50}$  sec, the force exerted on the wall is  
 (A) 4 N (B) 8 N (C)  $10^4$  N (D)  $2 \times 10^4$  N

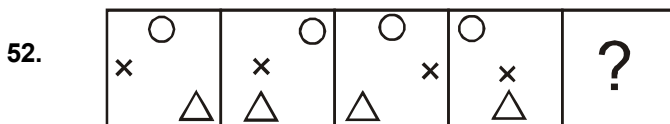
49. A body is dropped from the top of a tower. It falls through 40 m during the last two seconds of its fall. The height of tower is ( $g = 10 \text{ ms}^{-2}$ )  
 (A) 45 m (B) 50 m (C) 60 m (D) 80 m
50. Which one of the following graphs represents distance-time variation of a body released from the top of a tower ?



**PART IV : MENTAL ABILITY**  
**Single Correct Choice Type**

This part contains 10 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

**Direction (Q. No. 51 to 52) :** The figures in each of the following questions follow a series. Select the figure from the given alternatives which would continue the series.



**Direction (Q. No. 53 to 55) :** In the following questions numbers are arranged in the form of a pyramid. From this pyramid four sets of numbers are selected based on certain logic. Two of these are given on the left and two on the right of the sign (; :). One set of the numbers on the right goes missing. Choose that set of numbers from the alternatives which carries the same logic.

										16																		
										15	17	26																
										7	14	18	25	27														
										6	8	13	19	24	28	33												
										2	5	9	12	20	23	29	32	34										
1	3	4	10	11	21	22	30	31	35	36																		

53. 1, 2, 4 : 5, 10, 12, :: 31, 34, 36 : ?  
 (A) 11, 20, 22 (B) 24, 29, 33 (C) 23, 30, 32 (D) 20, 22, 29
54. 18, 19, 20 : 7, 8, 9 :: ? : 23, 24, 25  
 (A) 31, 32, 33 (B) 27, 28, 29 (C) 23, 24, 25 (D) 12, 13, 14
55. 3, 8, 17 : 4, 13, 26, :: ? : 17, 28, 35  
 (A) 26, 28, 35 (B) 15, 24, 31 (C) 17, 24, 31 (D) 26, 27, 33
56. A says, "If B gives me Rs. 40 he will have half as much as C. But if C gives me Rs. 40 then three of us will have the same amount. What is the total amount of money that A, B and C have among them ?  
 (A) 240 (B) 320 (C) 360 (D) 420
57. At the end of a dinner party all the eight people present shake hands with each other once. How many hand shakes will there be altogether ?  
 (A) 8 (B) 16 (C) 28 (D) 64
58. In an examination, a student attempted 15 questions correctly and secured 40 marks. If there were two types of questions i.e. of 2 marks and 4 marks, how many questions of 2 marks did he attempt correctly ?  
 (A) 5 (B) 10 (C) 12 (D) 15
59. The number of boys in a class is four times the number of girls. Which one of the following numbers cannot represent the total number of children in the class ?  
 (A) 5 (B) 16 (C) 30 (D) 40
60. Between two book ends in your study are displayed your four favourite puzzle books. If you decide to arrange the four books in every possible combination and move just one books every minute how long would it take you ?  
 (A) 24 minutes (B) 20 minutes (C) 8 minutes (D) 4 minutes