

Discover the Star within you and Get Rewarded

Paper Code: 01

# CAREER POINT STAR

Scholastic Test for Analysis and Reward

**CLASS - 11<sup>th</sup> (PCM)**

**(Class 11<sup>th</sup> Studying Students)**

Duration: 2:00 hours

Maximum marks: 300

## Instructions to Candidates

- CP Star Test paper consists of total 75 questions and has been divided in three sections as follows:

a. Physics	25 Questions	Que. No. 01 to 25
b. Chemistry	25 Questions	Que. No. 26 to 50
c. Mathematics	25 Questions	Que. No. 51 to 75
- All questions are compulsory.
- All the answers will be encircled in OMR sheet which is being provided along with this paper.
- For every correct answer marked by you, **4** marks will be allotted.
- For every incorrect answer marked by you, **1** marks will be deducted.
- Use of calculator is not permitted in any case.
- Any kind of malpractice will expel you from exam immediately.
- For any confusion please talk to the invigilator in the examination hall.
- For any kind of suggestions or complaints send Email at [info@cpil.in](mailto:info@cpil.in)



# CAREER POINT

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**SECTION-a [PHYSICS]**

**Q.1** The distance  $x$  covered by a body moving in a straight line in time  $t$  is given by

$$x^2 = t^2 + 2t + 3$$

The acceleration of the body will vary as

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

**Q.2** If the angle between the vector  $\vec{A}$  and  $\vec{B}$  is  $\theta$ , the value of the product  $(\vec{B} \times \vec{A}) \cdot \vec{A}$  is equal to :

- (1)  $BA^2 \cos \theta$       (2)  $BA^2 \sin \theta$   
 (3)  $BA^2 \sin \theta \cos \theta$       (4) zero

**Q.3** An experiment measured quantities  $a, b, c$  and then  $x$  is calculated from  $x = ab^2/c^3$ . If the percentage errors in  $a, b, c$  are  $\pm 1\%$ ,  $\pm 3\%$  and  $\pm 2\%$  respectively, the percentage error in  $x$  can be :

- (1)  $\pm 13\%$       (2)  $\pm 7\%$   
 (3)  $\pm 4\%$       (4)  $\pm 1\%$

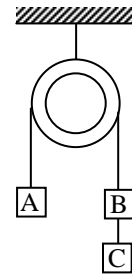
**Q.4** A particle moves in  $x$ - $y$  plane. The position vector of particle at any time  $t$  is  $\vec{r} = \{(2t)\hat{i} + (2t^2)\hat{j}\}$  m. The rate of change of  $\theta$  at time  $t = 2$ s. (where  $\theta$  is the angle which its velocity vector makes with positive  $x$ -axis) is

- (1)  $\frac{2}{17}$  rad/s      (2)  $\frac{1}{14}$  rad/s  
 (3)  $\frac{4}{7}$  rad/s      (4)  $\frac{6}{5}$  rad/s

**Q.5** An engine of a train moving with uniform acceleration passes an electric pole with velocity  $u$  and the last compartment with velocity  $v$ . The middle part of the train passes past the same pole with a velocity of -

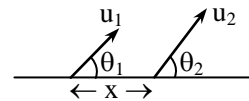
- (1)  $\frac{u+v}{2}$       (2)  $\frac{u^2+v^2}{2}$   
 (3)  $\sqrt{\frac{u^2+v^2}{2}}$       (4)  $\sqrt{\frac{v^2-u^2}{2}}$

**Q.6** Three equal weights  $A, B, C$  of mass  $2$  kg each are hanging on a string passing over a fixed frictionless pulley as shown in the fig. The tension in the string connecting weights  $B$  and  $C$  is-



- (1) zero      (2)  $13$  Newton  
 (3)  $3.3$  Newton      (4)  $19.6$  Newton

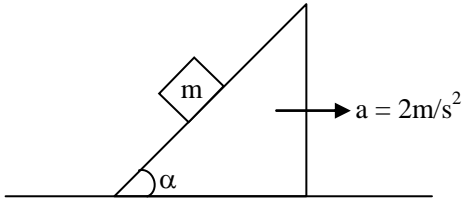
**Q.7** Two particles are projected simultaneously from the level ground as shown figure. They may collide after a time :



- (1)  $\frac{x \sin \theta_2}{u_1}$       (2)  $\frac{x \cos \theta_2}{u_2}$   
 (3)  $\frac{x \sin \theta_2}{u_1 \sin(\theta_2 - \theta_1)}$       (4)  $\frac{x \sin \theta_1}{u_2 \sin(\theta_2 - \theta_1)}$

*Space for rough work*

**Q.8** A block of mass  $m$  is lying on a wedge having inclination angle  $\alpha = \tan^{-1}\left(\frac{1}{5}\right)$ . Wedge is moving with a constant acceleration  $a = 2 \text{ m/s}^2$ . The minimum value of coefficient of friction  $\mu$ , so that  $m$  remains stationary w.r.t to wedge is

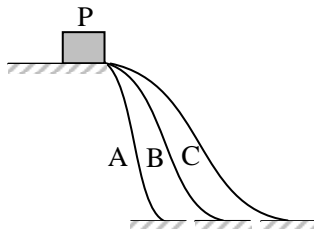


- (1)  $2/9$     (2)  $5/12$     (3)  $1/5$     (4)  $2/5$

**Q.9** A car of mass  $m$  is driven with a constant power  $P$ . Then the speed  $v$  reached by the car in traveling a distance  $x$  from rest is-

- (1)  $\sqrt{\frac{2xP}{m}}$                       (2)  $\left(\frac{3xP}{m}\right)^{1/3}$   
 (3)  $\left(\frac{4xP}{m}\right)^{1/4}$                       (4) none of the above

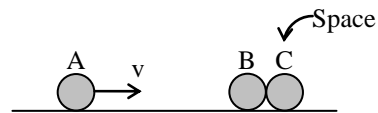
**Q.10** If  $v_A, v_B, v_C$  are the speeds of the block when it reaches the ground after sliding down the three frictionless slopes shown in figure, then



- (1)  $v_A > v_B > v_C$                       (2)  $v_A < v_B < v_C$   
 (3)  $v_A = v_B = v_C$                       (4) none of the above

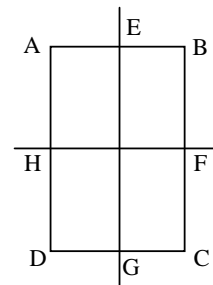
**Q.11** Two sphere of masses  $3\text{kg}$  and  $2\text{kg}$  collide directly. Their relative velocity before collision is  $15\text{m/s}$  and after collision is  $5\text{m/s}$ . The total loss of K.E. due to collision is -  
 (1)  $60 \text{ J}$                       (2)  $100 \text{ J}$   
 (3)  $120 \text{ J}$                       (4)  $150 \text{ J}$

**Q.12** As shown in figure A, B and C are identical balls B and C are at rest and, the ball A moving with velocity  $v$  collides elastically with ball B, then after collision -



- (1) All the three balls move with velocity  $v/2$   
 (2) A comes to rest and  $(B + C)$  moves with velocity  $v/\sqrt{2}$   
 (3) A moves with velocity  $v$  and  $(B + C)$  moves with velocity  $v$   
 (4) A and B come to rest and C moves with velocity  $v$

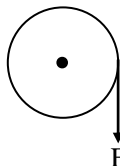
**Q.13** In a rectangle ABCD ( $BC = 2AB$ ), the moment of inertia along which axis will be minimum ?



- (1) BC    (2) BD    (3) HF    (4) EG

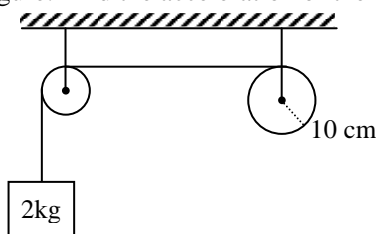
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- Q.14** A uniform disc of radius  $R$  and mass  $M$  can rotate without friction on an axle passing through its centre and perpendicular to its plane face. The cord is wound over the rim of this disc and a uniform force  $F$  is applied on the cord as shown in the figure. Then the angular acceleration in the disc is proportional to –



- (1)  $R^0$     (2)  $R$     (3)  $R^2$     (4)  $1/R$

- Q.15** A spring wrapped on a wheel of MOI  $0.2 \text{ kg m}^2$  and radius  $10 \text{ cm}$  over a light pulley to support a block of mass  $2 \text{ kg}$  as shown in figure. Find the acceleration of the block –



- (1)  $0.79 \text{ ms}^{-2}$     (2)  $1.12 \text{ ms}^{-2}$   
 (3)  $0.69 \text{ ms}^{-2}$     (4) none

- Q.16**  $5 \text{ gm}$  of water at  $30^\circ\text{C}$  and  $5 \text{ gm}$  of ice at  $-20^\circ\text{C}$  are mixed together in a calorimeter. The final temperature of the mixture will be (water equivalent of calorimeter is negligible, specific heat of ice =  $0.5 \text{ cal / gm}^\circ\text{C}$  and latent heat of ice =  $80 \text{ cal/gm}$ )
- (1)  $30^\circ\text{C}$     (2)  $-20^\circ\text{C}$     (3)  $10^\circ\text{C}$     (4)  $0^\circ\text{C}$

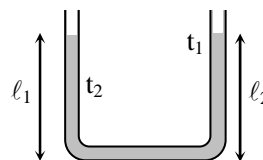
- Q.17** The rectangular surface of area  $8 \text{ cm} \times 8 \text{ cm}$  of a black body at a temperature of  $127^\circ\text{C}$  emits energy at the rate of  $E$  per second. If the length and breadth of the surface are each reduced to half of its initial value, and the temperature is raised to  $327^\circ\text{C}$ , the rate of emission of energy will become –

- (1)  $\frac{3}{8}E$     (2)  $\frac{81}{16}E$     (3)  $\frac{9}{16}E$     (4)  $\frac{81}{64}E$

- Q.18** The rate of cooling of a body by radiation depends on –

- (a) Area of body  
 (b) Mass of body  
 (c) Specific heat of body  
 (d) Temperature of body and surroundings
- (1) a,b,c    (2) b,c  
 (3) a,b,c,d    (4) c,d

- Q.19** In a vertical U-tube containing a liquid, the two arms are maintained at different temperatures,  $t_1$  and  $t_2$ . The liquid columns in the two arms have heights  $l_1$  and  $l_2$  respectively. The coefficient of volume expansion of the liquid is equal to –



- (1)  $\frac{l_1 - l_2}{l_2 t_1 - l_1 t_2}$     (2)  $\frac{l_1 - l_2}{l_1 t_1 - l_2 t_2}$   
 (3)  $\frac{l_1 + l_2}{l_2 t_1 + l_1 t_2}$     (4)  $\frac{l_1 + l_2}{l_1 t_1 + l_2 t_2}$

*Space for rough work*

**Q.20** A pendulum clock (fitted with a small heavy bob that is connected with a metal rod) is 5 seconds fast each day at a temperature of  $15^{\circ}\text{C}$  and 10 seconds slow at a temperature of  $30^{\circ}\text{C}$ . The temperature at which it is designed to give correct time, is -

- (1)  $18^{\circ}\text{C}$                       (2)  $20^{\circ}\text{C}$   
 (3)  $24^{\circ}\text{C}$                       (4)  $25^{\circ}\text{C}$

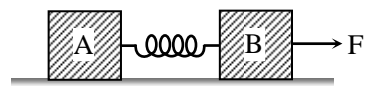
**Q.21** A car is moving in a circular horizontal track of radius 10 m with a constant speed of 10 m/s. A plumb bob is suspended from the roof of the car by a light rigid rod of length 1.0 m. The angle made by the rod with the track is -

- (1) Zero                              (2)  $30^{\circ}$   
 (3)  $45^{\circ}$                               (4)  $60^{\circ}$

**Q.22** In a simple pendulum, the breaking strength of the string is double the weight of the bob. The bob is released from rest when the string is horizontal. The string breaks when it makes an angle  $\theta$  with the vertical-

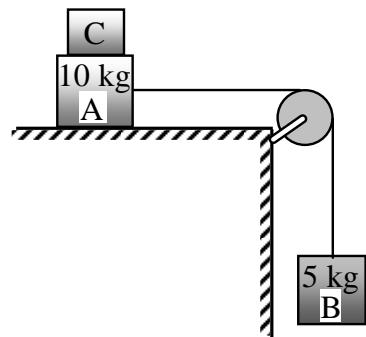
- (1)  $\theta = \cos^{-1}(1/3)$               (2)  $\theta = 60^{\circ}$   
 (3)  $\theta = \cos^{-1}(2/3)$               (4)  $\theta = 0^{\circ}$

**Q.23** Two bodies A and B each of mass M are fixed together by a massless spring. A force F acts on the mass B as shown in figure. At the instant shown the mass A has acceleration 'a'. What is the acceleration of mass B ?



- (1)  $(F/M) - a$                       (2) a  
 (3)  $-a$                               (4)  $\left(\frac{F}{M}\right)$

**Q.24** Two masses A and B of 10 kg and 5 kg respectively are connected with a string passing over a frictionless pulley fixed at the corner of a table as shown in figure. The coefficient of friction of A with the table is 0.2. The minimum mass of C that may be placed on A to prevent it from moving is equal to :



- (1) 15 kg                              (2) 10 kg  
 (3) 5 kg                                (4) zero

**Q.25** A particle is moving in a circular path with velocity varying with time as  $v = 1.5t^2 + 2t$ . If 2 cm the radius of circular path, the angular acceleration at  $t = 2$  sec will be -

- (1)  $4 \text{ rad/sec}^2$                       (2)  $40 \text{ rad/sec}^2$   
 (3)  $400 \text{ rad/sec}^2$                   (4)  $0.4 \text{ rad/sec}^2$

*Space for rough work*

**SECTION-b [CHEMISTRY]**

**Q.26** Which of the following orbitals does not have an angular node ?

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

**Q.27** When a hydrogen atom emits a photon of energy 12.1 eV, the orbit angular momentum changes by

- (1)  $1.05 \times 10^{-34}$  J sec  
(2)  $2.10 \times 10^{-34}$  J sec  
(3)  $3.16 \times 10^{-34}$  J sec  
(4)  $4.22 \times 10^{-34}$  J sec

**Q.28** Which of the following sets of quantum numbers belongs to the electron having highest energy ?

- (1)  $n = 4, l = 0, m = 0, s = +\frac{1}{2}$   
(2)  $n = 3, l = 0, m = 0, s = +\frac{1}{2}$   
(3)  $n = 3, l = 1, m = 1, s = +\frac{1}{2}$   
(4)  $n = 3, l = 2, m = 1, s = +\frac{1}{2}$

**Q.29** The proper value of significant figures in,  $38.0 + 0.0035 + 0.00003$  is -

- (1) 38                      (2) 38.0035  
(3) 38.00353          (4) 38.0

**Q.30** At S.T.P., 5.6 litres of a gas weighs 10 grams. The vapour density of the gas is

- (1) 32      (2) 40      (3) 20      (4) 8

**Q.31** The density of a liquid is 1.2 g/mL. There are 35 drops in 2 mL. The number of molecules in 1 drop is : (molecular weight of liquid = 70)

- (1)  $\frac{1.2}{35} N_A$                       (2)  $\left(\frac{1}{35}\right)^2 N_A$   
(3)  $\frac{1.2}{(35)^2} N_A$                       (4)  $1.2 N_A$

**Q.32** In Haber process, 30 litres of dihydrogen and 30 litres of dinitrogen were taken for reaction which yielded only 50% of the expected product. What will be the composition of the gaseous mixture under the aforesaid condition in the end ?

- (1) 20 litres ammonia, 20 litres nitrogen, 20 litres hydrogen  
(2) 10 litres ammonia, 25 litres nitrogen, 15 litres hydrogen  
(3) 20 litres ammonia, 10 litres nitrogen, 30 litres hydrogen  
(4) 20 litres ammonia, 25 litres nitrogen, 15 litres hydrogen

**Q.33** The O—O bond length in  $O_2$ ,  $O_2[AsF_4]$  and  $K[O_2]$  is:

- (1)  $O_2[AsF_4] < O_2 < K[O_2]$   
(2)  $O_2[AsF_4] < K[O_2] < O_2$   
(3)  $O_2 < O_2[AsF_4] < K[O_2]$   
(4)  $K[O_2] < O_2 < O_2[AsF_4]$

**Q.34** The correct order of bond angles in the molecules,  $H_2O$ ,  $NH_3$ ,  $CH_4$  and  $CO_2$  is

- (1)  $H_2O > NH_3 > CH_4 > CO_2$   
(2)  $H_2O < NH_3 < CO_2 < CH_4$   
(3)  $H_2O < NH_3 > CO_2 > CH_4$   
(4)  $CO_2 > CH_4 > NH_3 > H_2O$

*Space for rough work*

- Q.35** Select the incorrect order for the given properties :
- (1) Thermal stability :  $\text{BaSO}_4 > \text{SrSO}_4 > \text{CaSO}_4$
  - (2) Solubility :  $\text{BaSO}_4 < \text{SrSO}_4 < \text{CaSO}_4$
  - (3) Thermal stability :  $\text{Li}_2\text{CO}_3 < \text{Na}_2\text{CO}_3 < \text{K}_2\text{CO}_3$
  - (4) Solubility :  $\text{NaHCO}_3 > \text{KHCO}_3 > \text{RbHCO}_3$
- Q.36** The order O–O bond length in  $\text{O}_2$ ,  $\text{H}_2\text{O}_2$ ,  $\text{O}_3$  is -
- (1)  $\text{O}_2 > \text{O}_3 > \text{H}_2\text{O}_2$
  - (2)  $\text{O}_3 > \text{H}_2\text{O}_2 > \text{O}_2$
  - (3)  $\text{H}_2\text{O}_2 > \text{O}_3 > \text{O}_2$
  - (4)  $\text{O}_2 > \text{H}_2\text{O}_2 > \text{O}_3$
- Q.37** In which set of molecules are all the species paramagnetic ?
- (1)  $\text{B}_2$ ,  $\text{O}_2$ ,  $\text{N}_2$
  - (2)  $\text{B}_2$ ,  $\text{O}_2$ ,  $\text{NO}$
  - (3)  $\text{B}_2$ ,  $\text{F}_2$ ,  $\text{O}_2$
  - (4)  $\text{B}_2$ ,  $\text{O}_2$ ,  $\text{Li}_2$
- Q.38** Among  $\text{LiCl}$ ,  $\text{BeCl}_2$ ,  $\text{BCl}_3$  and  $\text{CCl}_4$ , the covalent bond character follows the order-
- (1)  $\text{LiCl} < \text{BeCl}_2 > \text{BCl}_3 > \text{CCl}_4$
  - (2)  $\text{LiCl} > \text{BeCl}_2 < \text{BCl}_3 < \text{CCl}_4$
  - (3)  $\text{LiCl} < \text{BeCl}_2 < \text{BCl}_3 < \text{CCl}_4$
  - (4)  $\text{LiCl} > \text{BeCl}_2 > \text{BCl}_3 > \text{CCl}_4$
- Q.39** Which represents incorrect order of boiling point ?
- (1)  $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$
  - (2)  $\text{BiH}_3 > \text{SbH}_3 > \text{NH}_3 > \text{AsH}_3 > \text{PH}_3$
  - (3) O-Nitrophenol < m-Nitrophenol
  - (4)  $\text{ICl} > \text{Br}_2$
- Q.40** How many  $p\pi-d\pi$  bonds are present in  $\text{SO}_2$  ?
- (1) 1
  - (2) 2
  - (3) 3
  - (4) 0
- Q.41** In the reaction,  $\text{P}_2\text{H}_4 \longrightarrow \text{PH}_3 + \text{P}_4\text{H}_2$  the equivalent mass of  $\text{P}_2\text{H}_4$  may be given as -
- (1)  $\frac{3m}{4}$
  - (2)  $\frac{5m}{6}$
  - (3)  $\frac{3m}{5}$
  - (4)  $\frac{12m}{13}$
- Q.42** Volume of 0.1 M  $\text{K}_2\text{Cr}_2\text{O}_7$  required to oxidise 35 mL of 0.5 M  $\text{FeSO}_4$  solution is -
- (1) 29.2 mL
  - (2) 17.5 mL
  - (3) 175 mL
  - (4) 145 mL
- Q.43** An ideal gas will have maximum density when :
- (1)  $P = 0.5 \text{ atm}$ ,  $T = 600 \text{ K}$
  - (2)  $P = 2 \text{ atm}$ ,  $T = 150 \text{ K}$
  - (3)  $P = 1 \text{ atm}$ ,  $T = 300 \text{ K}$
  - (4)  $P = 1.0 \text{ atm}$ ,  $T = 500 \text{ K}$
- Q.44** At what temperature the molar KE of He will be equal to that of Ar at 400 K ?
- (1) 700 K
  - (2) 400 K
  - (3) 300 K
  - (4) 600 K
- Q.45** Which of the following processes requires maximum energy ?
- (1)  $\text{Ca}^{+2}(\text{g}) \longrightarrow \text{Ca}^{+3}(\text{g}) + \text{e}^-$
  - (2)  $\text{Na}^{+2}(\text{g}) \longrightarrow \text{Na}^{+3}(\text{g}) + \text{e}^-$
  - (3)  $\text{Al}^{+2}(\text{g}) \longrightarrow \text{Al}^{+3}(\text{g}) + \text{e}^-$
  - (4)  $\text{Mg}^{+2}(\text{g}) \longrightarrow \text{Mg}^{+3}(\text{g}) + \text{e}^-$
- Q.46** In which of the following processes, maximum energy is released ?
- (1)  $\text{O}(\text{g}) + \text{e}^- \longrightarrow \text{O}^-(\text{g})$
  - (2)  $\text{O}^-(\text{g}) + \text{e}^- \longrightarrow \text{O}^{2-}(\text{g})$
  - (3)  $\text{S}(\text{g}) + \text{e}^- \longrightarrow \text{S}^-(\text{g})$
  - (4)  $\text{S}^-(\text{g}) + \text{e}^- \longrightarrow \text{S}^{2-}(\text{g})$

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**SECTION-C MATHEMATICS]**

**Q.47** The basic character of MgO, SrO, K<sub>2</sub>O and NiO increases in the order -

- (1) K<sub>2</sub>O < SrO < MgO < NiO
- (2) NiO < MgO < SrO < K<sub>2</sub>O
- (3) MgO < NiO < SrO < K<sub>2</sub>O
- (4) K<sub>2</sub>O < MgO < NiO < SrO

**Q.48** For which reaction K<sub>p</sub> is less than K<sub>c</sub> :

- (1) N<sub>2</sub>O<sub>4</sub> ⇌ 2NO<sub>2</sub>
- (2) 2HI ⇌ H<sub>2</sub> + I<sub>2</sub>
- (3) 2SO<sub>2</sub> + O<sub>2</sub> ⇌ 2SO<sub>3</sub>
- (4) N<sub>2</sub> + O<sub>2</sub> ⇌ 2NO

**Q.49** For the reaction, A + B ⇌ C + D, the initial concentration of A and B are equal, but the equilibrium concentration of C is twice that of equilibrium concentration of A. The equilibrium constant is :

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

**Q.50** For which of the following reaction, product formation is favoured at low pressure and low temperature ?

- (1) CO<sub>2</sub>(g) + C(s) ⇌ 2CO(g); ΔH° = 172.5 kJ
- (2) CO(g) + 2H<sub>2</sub>(g) ⇌ CH<sub>3</sub>OH; ΔH° = -21.7 kJ
- (3) 2O<sub>3</sub>(g) ⇌ 3O<sub>2</sub>(g); ΔH° = -285 kJ
- (4) H<sub>2</sub>(g) + F<sub>2</sub>(g) ⇌ 2HF(g); ΔH° = -541 kJ

**Q.51** If a<sub>1</sub>, a<sub>2</sub>, a<sub>3</sub>, ..... a<sub>24</sub> are in A.P. and a<sub>1</sub> + a<sub>5</sub> + a<sub>10</sub> + a<sub>15</sub> + a<sub>20</sub> + a<sub>24</sub> = 225, then

a<sub>1</sub> + a<sub>2</sub> + a<sub>3</sub> + ..... + a<sub>23</sub> + a<sub>24</sub> is equal to

- (1) 909
- (2) 75
- (3) 750
- (4) 900

**Q.52** The number of terms common to the Arithmetic progressions 3, 7, 11,....., 407 and 2, 9, 16,.....,709 is

- (1) 51
- (2) 14
- (3) 21
- (4) 28

**Q.53** The value of 0.42̇3̇ is -

- (1)  $\frac{419}{999}$
- (2)  $\frac{419}{990}$
- (3)  $\frac{423}{1000}$
- (4)  $\frac{423}{990}$

**Q.54** The roots of the equation

(p - q)x<sup>2</sup> + (q - r)x + (r - p) = 0 are -

- (1)  $\frac{p-q}{r-p}, 1$
- (2)  $\frac{q-r}{p-q}, 1$
- (3)  $\frac{r-p}{p-q}, 1$
- (4) None of these

*Space for rough work*



**Q.55** Two students while solving a quadratic equation  $x^2 + bx + c = 0$ , one copied the constant term incorrectly and got the roots 3 and 2. The other copied the coefficient of  $x$  incorrectly and got root as  $-6$  and  $1$  respectively, the correct roots are-

- (1) 3,  $-2$                       (2)  $-3, 2$   
 (3)  $-6, -1$                       (4)  $6, -1$

**Q.56** If  $2 + i\sqrt{3}$  is a root of the equation  $x^2 + px + q = 0$ , where  $p$  and  $q$  are real, then  $(p, q)$  is equal to -

- (1)  $(-4, 7)$                       (2)  $(4, -7)$   
 (3)  $(4, 7)$                       (4)  $(-4, -7)$

**Q.57** If  $A$  lies in the second quadrant &  $3 \tan A + 4 = 0$ , the value  $2 \cot A - 5 \cos A + \sin A$  is equals to-

- (1)  $\frac{23}{11}$                               (2)  $\frac{22}{10}$   
 (3)  $\frac{23}{10}$                               (4)  $\frac{10}{23}$

**Q.58** If  $\sin \theta_1 + \sin \theta_2 + \sin \theta_3 = 3$ , then  $\cos \theta_1 + \cos \theta_2 + \cos \theta_3$  is equal to -

- (1) 3                                  (2) 2  
 (3) 1                                  (4) 0

**Q.59** If  $\sin \theta = -\frac{1}{\sqrt{2}}$  and  $\tan \theta = 1$ , then  $\theta$  lies in which quadrant-

- (1) First                              (2) Second  
 (3) Third                              (4) Fourth

**Q.60** In a group of 13 cricket players, four are bowlers. Find out in how many ways can they form a cricket team of 11 players in which at least 2 bowlers are included.

- (1) 55                                  (2) 72  
 (3) 78                                  (4) 80

**Q.61** If a polygon has 44 diagonals, then the number of its sides are -

- (1) 11                                  (2) 7  
 (3) 8                                  (4) 10

**Q.62** How many 7 letters word can be formed using the letters of the word 'ARIHANT' ?

- (1)  $7!$                                   (2)  $2!$   
 (3) 2520                              (4)  $6!$

**Q.63** The points  $(3, 3)$ ,  $(h, 0)$  and  $(0, k)$  are collinear, if  $\frac{1}{h} + \frac{1}{k}$  is equal to -

- (1)  $\frac{1}{2}$                                   (2)  $\frac{1}{3}$   
 (3) 1                                  (4) None

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*Space for rough work*

**Q.64** The point P(a, b) lies on the straight line  $3x + 2y = 13$  and the point Q(b, a) lies on the straight line  $4x - y = 5$ , then the equation of line PQ is

- (1)  $x - y = 5$                       (2)  $x + y = 5$   
 (3)  $x + y = -5$                     (4)  $x - y = -5$

**Q.65** Let PS be the median of the triangle with vertices P(2, 2), Q(6, -1) and R(7, 3). Then equation of the line passing through (1, -1) and parallel to PS is -

- (1)  $2x - 9y - 7 = 0$   
 (2)  $2x - 9y - 11 = 0$   
 (3)  $2x + 9y - 11 = 0$   
 (4)  $2x + 9y + 7 = 0$

**Q.66** If  $x \in \mathbb{R}$  and  $2^{2\log_8 9} + 3^{\log_2 16} = 10^{\log_x 83}$  then x equals -

- (1) 1                                      (2) 83  
 (3) 10                                    (4) 81

**Q.67** The real roots of the equation

$$7^{\log_7(x^2 - 4x + 5)} = x - 1 \text{ are -}$$

- (1) 1 and 2                              (2) 2 and 3  
 (3) 3 and 4                              (4) 4 and 5

**Q.68** The lines  $2x - 3y = -1$  and  $x + y = 2$  are diameters of a circle and radius is 2 units. Then the equation of the circle is -

- (1)  $x^2 + y^2 + 2x + 2y + 2 = 0$   
 (2)  $x^2 + y^2 - 2x - 2y - 2 = 0$   
 (3)  $x^2 + y^2 + 2x - 2y + 2 = 0$   
 (4) None of these

**Q.69** If straight line  $y = mx + 4$  is tangent to the circle  $x^2 + y^2 = 9$ . Then 'm' is equal to -

- (1)  $\frac{\sqrt{7}}{3}$                                       (2)  $\frac{7}{3}$   
 (3)  $\frac{7}{9}$                                         (4) None

**Q.70** The equation of the tangents to the circle  $x^2 + y^2 - 6x + 4y = 12$  which are parallel to the straight line  $4x + 3y + 5 = 0$ , is -

- (1)  $2x - 3y + 19 = 0, 4x - 3y - 31 = 0$   
 (2)  $4x + 3y - 19 = 0, 6x + 5y + 31 = 0$   
 (3)  $4x + 3y + 19 = 0, 4x + 3y - 31 = 0$   
 (4) None of these

**Q.71** The general solution of  $7 \cos^2\theta + 3 \sin^2\theta = 4$ , is-

- (1)  $n\pi \pm \frac{\pi}{4}, n \in \mathbb{Z}$       (2)  $n\pi \pm \frac{\pi}{3}, n \in \mathbb{Z}$   
 (3)  $n\pi \pm \frac{\pi}{2}, n \in \mathbb{Z}$       (4)  $n\pi \pm \frac{\pi}{6}, n \in \mathbb{Z}$

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*Space for rough work*

**Q.72** If  $\cot \theta - \tan \theta = \sec \theta$ , then  $\theta =$

(1)  $n\pi + (-1)^n \frac{\pi}{6}$ ,  $n \in \mathbb{Z}$

(2)  $(4n + 1) \frac{\pi}{6}$ ,  $n \in \mathbb{Z}$

(3)  $(3n + 1) \frac{\pi}{6}$ ,  $n \in \mathbb{Z}$

(4)  $(4n - 1) \frac{\pi}{6}$ ,  $n \in \mathbb{Z}$

**Q.73**  $\frac{1}{n!} + \frac{1}{2!(n-2)!} + \frac{1}{4!(n-4)!} + \dots$  is equal to

(1)  $\frac{2^{n-1}}{n!}$

(2)  $\frac{2^n}{n!}$

(3)  $\frac{2^{n-2}}{(n-1)!}$

(4)  $\frac{2^n}{(n+1)!}$

**Q.74** Coefficient of  $a^5b^7$  in the expansion of  $(a - 2b)^{12}$  is -

(1)  ${}^{12}C_7 2^7$

(2)  $-{}^{12}C_5 2^7$

(3)  ${}^{12}C_5 2^5$

(4)  $-{}^{12}C_6 2^7$

**Q.75** If the  $r^{\text{th}}$  term in the expansion of  $(x/3 - 2/x^2)^{10}$  contains  $x^4$ , then  $r$  is equal to -

(1) 2

(2) 3

(3) 4

(4) 5

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*Space for rough work*

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