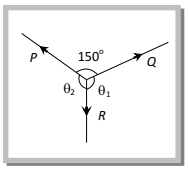
1. P, Q and R are three coplanar forces acting at a point and are in equilibrium. Given P = 1.9318 kg wt, =1sinq 20.9659, the value of R is (in kg wt)

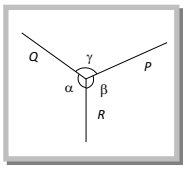
(a) 0.9659
(b) 2
(c) 1
(d) 21

[CET 1998]



2. A body is in equilibrium under the action the action of three coplanar forces P, Q and R as shown in the figure. Select the correct statement

[AFMC 1994]



(a) $\frac{P}{\sin\alpha}=\frac{Q}{\sin\beta}=\frac{R}{\sin\gamma}$ (b) $\frac{P}{\cos\alpha}=\frac{Q}{\cos\beta}=\frac{R}{\cos\gamma}$

(c) $\frac{P}{\tan\alpha}=\frac{Q}{\tan\beta}=\frac{R}{\tan\gamma}$ (d) $\frac{P}{\sin\beta}=\frac{Q}{\sin\gamma}=\frac{R}{\sin\alpha}$

3. If a body is in equilibrium under a set of non-collinear forces, then the minimum number of forces has to be [AIIMS 2000]

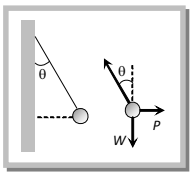
(a) Four (b) Three
(c) Two (d) Five

4. How many minimum number of non-zero vectors in different planes can be added to give zero resultant

(a) 2 (b) 3
(c) 4 (d) 5

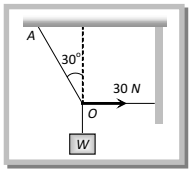
5. A metal sphere is hung by a string fixed to a wall. The sphere is pushed away from the wall by a stick. The forces acting on the sphere are shown in the second diagram. Which of the following statements is wrong

(a) $P = W\tan\theta$
(b) $\vec{T}+\vec{P}+\vec{W}=0$
(c) $T^2 = P^2 + W^2$
(d) $T = P + W$



6. As shown in figure the tension in the horizontal cord is 30 N. The weight W and tension in the string OA in Newton are [DPMT 1992]

(a) $30\sqrt{3}$,30
(b) $30\sqrt{3}$,60
(c) $60\sqrt{3}$,30
(d) None of these



PROBLEMS ABASED ON RELATIVE VELOCITY:-

7. A 150 m long train is moving to north at a speed of 10 m/s. A parrot flying towards south with a speed of 5 m/s crosses the train. The time taken by the parrot the cross to train would be:

(a) 30 s (b) 15 s **[CBSE PMT 1992]**
(c) 8 s (d) 10 s

8. A swimmer can swim in still water with speed and the river is flowing with velocity v/2. To cross the river in shortest time, he should swim making angle with the upstream. What is the ratio of the time taken to swim across the shortest time to that is swimming across over shortest distance

(a) cos θ (b) sin θ
(c) tan θ (d) cot θ

9. The speed of a boat is 5 km/h in still water. It crosses a river of width 1 km along the shortest possible path in 15 minutes. The velocity of the river water is [CBSE PMT 1998]

(a) 1 km/h (b) 3 km/h
(c) 4 km/h (d) 5 km/h

10. A river is flowing from east to west at a speed of 5 m/min. A man on south bank of river, capable of swimming 10m/min in still water, wants to swim across the river in shortest time. He should swim

(a)Due north **[BHU 1998]**
(b)Due north-east
(c)Due north-east with double the speed of river
(d)None of these

11. A person aiming to reach the exactly opposite point on the bank of a stream is swimming with a speed of 0.5 m/s at an angle of 1200 with the direction of flow of water. The speed of water in the stream is [CBSE PMT 1999]

(a) 1 m/s (b) 0.5 m/s
(c) 0.25 m/s (d) 0.433 m/s

12. A moves with 65 km/h while B is coming back of A with 80 km/h. The relative velocity of B with respect to A is [AFMC 2000]

(a) 80 km/h (b) 60 km/h
(c) 15 km/h (d) 145 km/h

13. A man crosses a 320 m wide river perpendicular

to the current in 4 minutes. If in still water he can swim with a speed 5/3 times that of the current, then the speed of the current, in m/min is

(a) 30 (b) 40 **[Roorkee 1998]**

(c) 50 (d) 60

14. A thief is running away on a straight road on a jeep moving with a speed of 9 m/s. A police man chases him on a motor cycle moving at a speed of 10 m/s. If the instantaneous separation of jeep from the motor cycle is 100 m, how long will it take for the policemen to catch the thief

(a) 1 second (b) 19 second

(c) 90 second (d) 100 second

15. A bus is moving with a velocity 10 m/s on a straight road. A scooterist wishes to overtake the bus in 100 s. If the bus is at a distance of 1 km from the scooterist, with what velocity should the scooterist chase the bus

(a) 50 m/s (b) 40 m/s

(c) 30 m/s (d) 20 m/s

16. A man can swim with velocity v relative to water. He has to cross a river of width d flowing with a velocity u (u >v). The distance through which he is carried down stream by the river is x. Which of the following statement is correct

(a) If he crosses the river in minimum time $\frac{du}{v}$

(b) x can not be less than $x = \frac{du}{v}$

(c) For x to be minimum he has to swim in a direction making an angle of $\frac{\pi}{2} + \sin^{-1}\frac{v}{u}$ with the direction of the flow of water

(d) x will be max. if he swims in a direction making an angle of $\frac{\pi}{2} + \sin^{-1}\left(\frac{v}{u}\right)$ with direction of the flow of

Answer

01.	02.	03.	04.	05.	06.	07.	08.	09.	10.	11.	12.	13.	14.	15.	16.
c	a	b	c	d	b	d	b	b	a	c	c	a	d	d	a,c