

SCIENTIFIC SECTION

Mathematics

Applications

By a group of supervisors



FIRST TERM

2

SEC.
2024

EXAMINATIONS

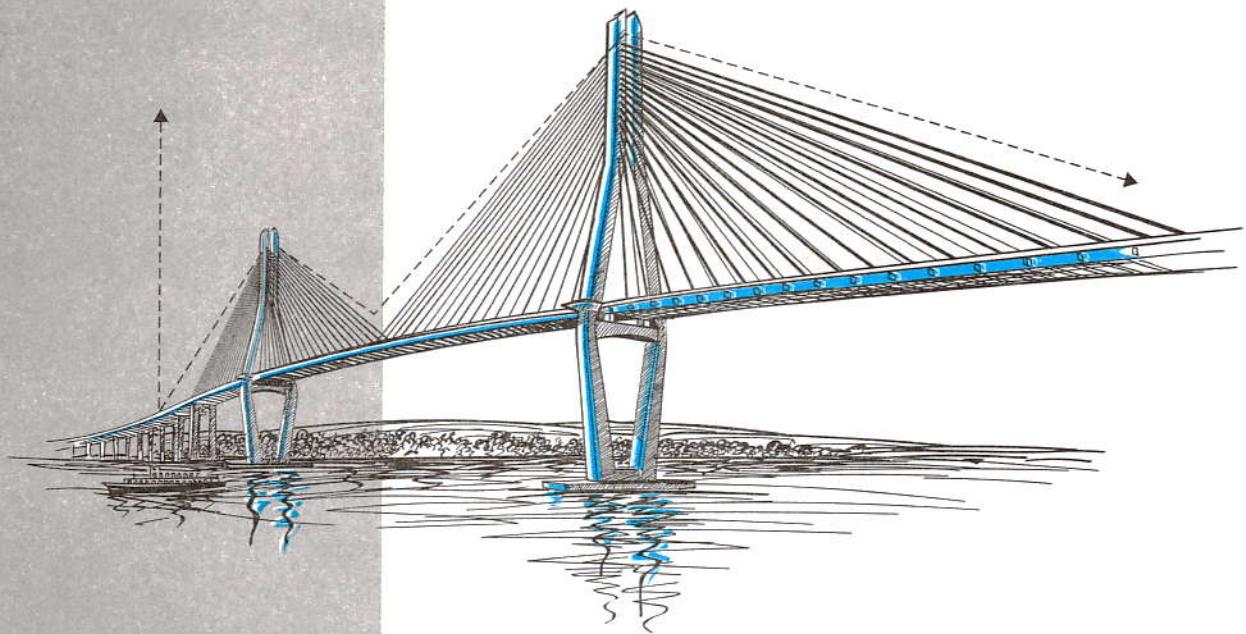




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Preface

According to our ambitious plan to develop our books in mathematics for the secondary stage - regarding our complete faith of the importance of continuous assessment (evaluation) for managing the educational system to decide on the standards of students step by step to reach the main target, we introduce this book : "Examinations Part".

Wishing our books would win your trust and admiration.

We'll be grateful if you send us your recommendations and your comments.

The Authors

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1



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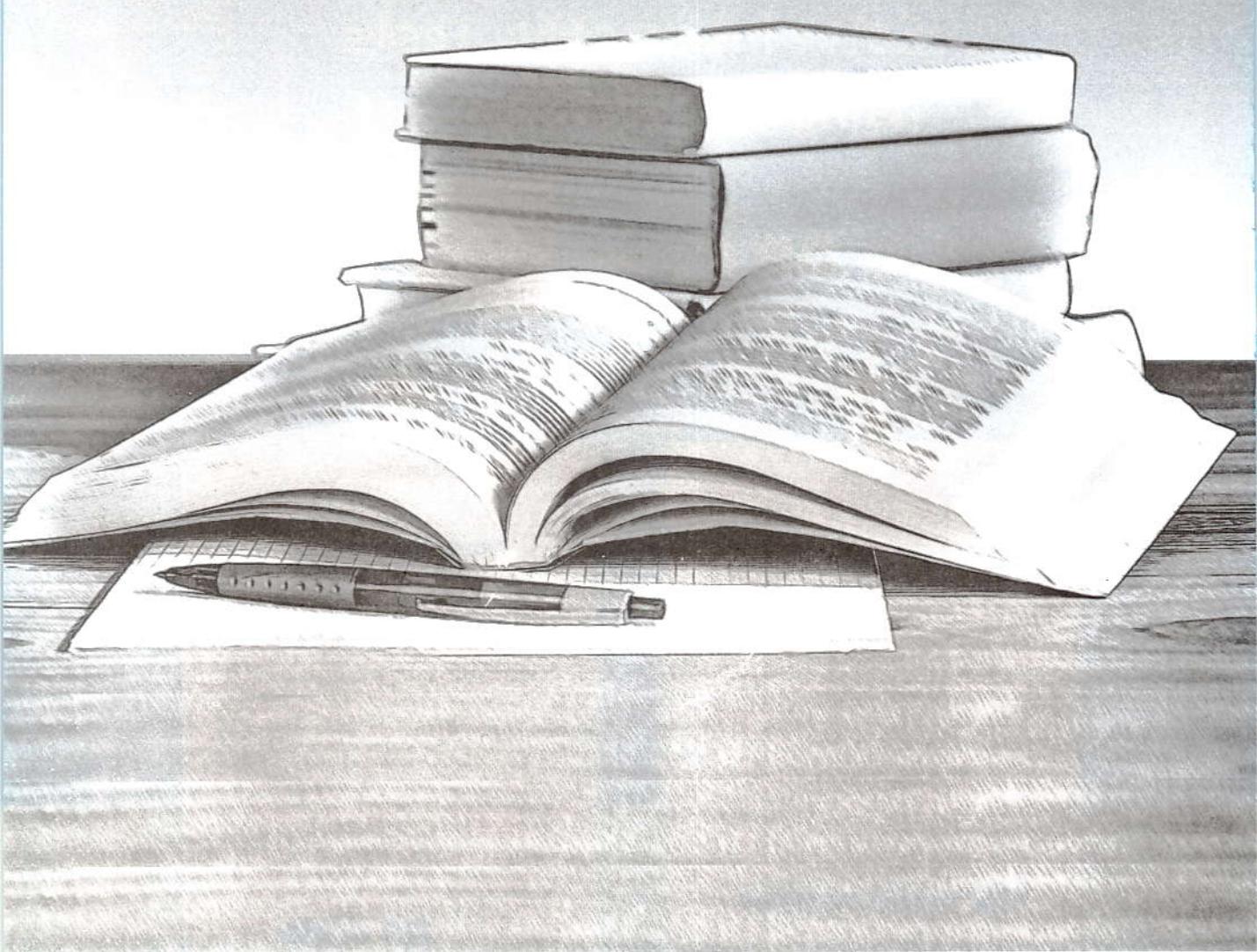
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- ▶ Monthly tests.
- ▶ School book examination.
- ▶ Final examinations.
- ▶ Answers.

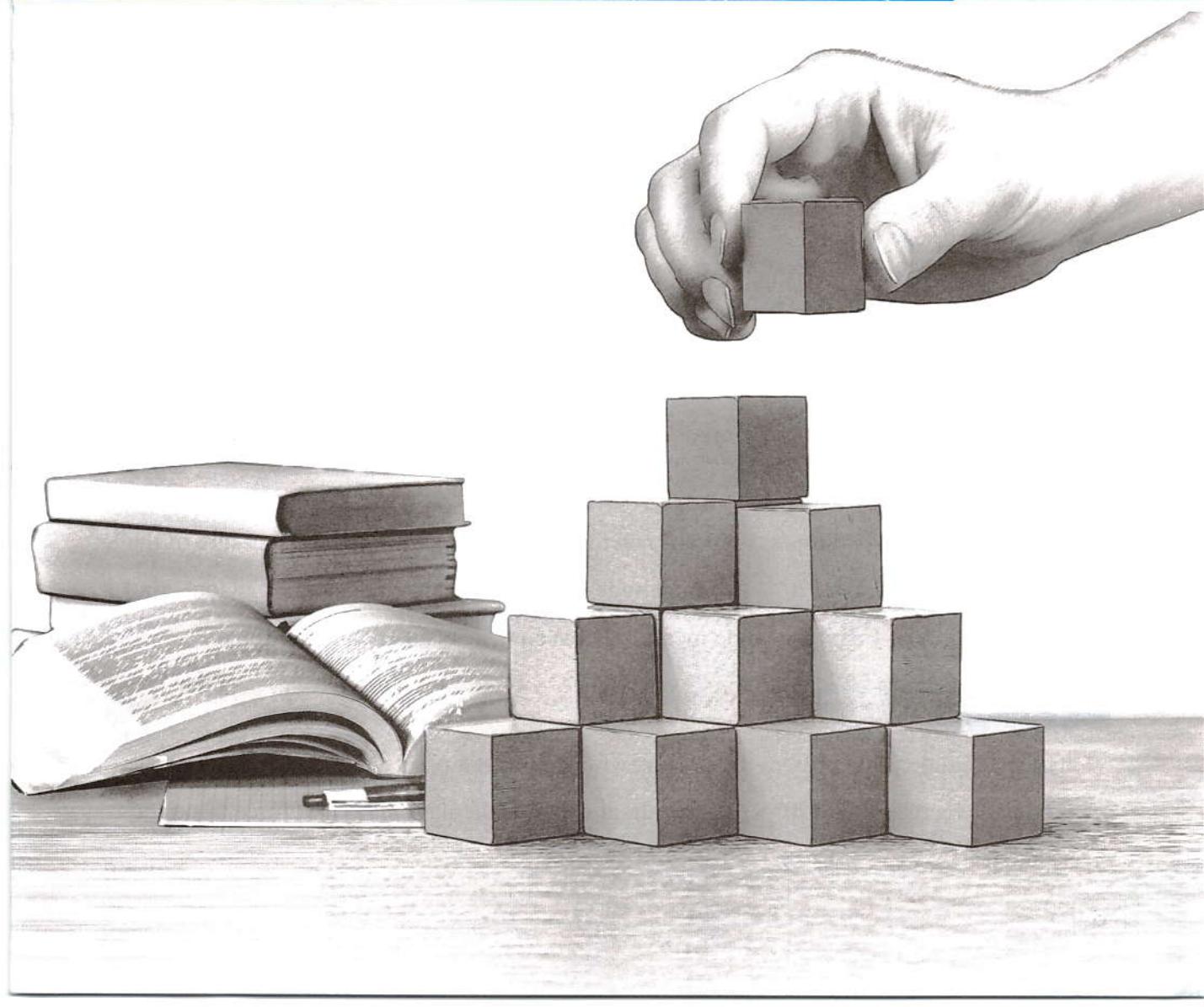
Accumulative Quizzes

FIRST

Accumulative quizzes on statics.

SECOND

Accumulative quizzes on geometry
and measurement.



Total mark

Quiz

1

on lesson 1 – unit 1

10

Answer the following questions :

First question

4 marks

1 mark for each item

Choose the correct answer from those given :

- (1) $\vec{F}_1 = 2 \hat{i} + 3 \hat{j}$, $\vec{F}_2 = \hat{i} + \hat{j}$ where F_1 , F_2 are measured in newton then the magnitude of their resultant newton.

(a) $\sqrt{2}$ (b) $\sqrt{5}$ (c) $\sqrt{13}$ (d) 5

- (2) Two forces are equal act at a point and the measure of the angle between them is $\frac{\pi}{3}$ and their resultant is 3 newton , then the magnitude of each is newton.

(a) $\frac{3}{2}$ (b) $\sqrt{3}$ (c) 3 (d) $3\sqrt{3}$

- (3) The resultant of two forces acting at a point is maximum when the included angle between them is equal to

(a) zero (b) 60° (c) 120° (d) 180°

- (4) The magnitude of the resultant of two forces 3 , 5 newton and the measure of their included angle is 60° equals newton.

(a) 2 (b) 6 (c) 7 (d) 8

Second question

3 marks

The magnitude of two forces are F , 4 newton acting at a point , and the measure of the angle between them is 120° , the magnitude of their resultant equals $4\sqrt{3}$ newton , find the magnitude of \vec{F} and the angle measure between their resultant and the force \vec{F}

Third question

3 marks

The magnitude of two forces are 4 , F newton acting at a point , and the measure of the angle between them is 120° , their resultant is perpendicular on the first force. Find the value of F

Quiz

2

till lesson 2 – unit 1

10

Total mark

Answer the following questions :

First question *4 marks*

1 mark for each item

Choose the correct answer from those given :

- (1) Two forces of magnitude 3 F and 2 F intersecting at a point and their resultant is 5 F , then the measure of the angle between them is

- (a) zero° (b) 60° (c) 20° (d) 180°

- (2) As resolving the force \vec{R} into two forces \vec{F}_1 and \vec{F}_2 making with \vec{R} two angles of measure θ_1 and θ_2 on both sides of \vec{R} respectively , then the magnitude of $\vec{F}_1 = \dots$

- (a) $\frac{R \sin \theta_1}{\sin(\theta_1 + \theta_2)}$ (b) $\frac{R \sin \theta_2}{\sin(\theta_1 - \theta_2)}$ (c) $\frac{R \sin \theta_2}{\sin(\theta_1 + \theta_2)}$ (d) $\frac{R \sin(\theta_1 + \theta_2)}{\sin \theta_2}$

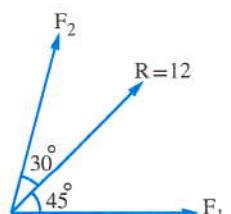
- (3) Two forces of equal magnitudes , inclosing between them an angle of measure 90°
If the magnitude of their resultant is 8 N , then the value of each force measured in
newton is

- (a) $2\sqrt{2}$ (b) 4 (c) $4\sqrt{2}$ (d) 8

- (4) In the given figure :

$$F_1 = \dots$$

- (a) $12 \cos 75^\circ$ (b) $12 \cos 45^\circ$
(c) $6 \sec 45^\circ$ (d) $6 \csc 75^\circ$



Second question 3 marks

Two forces of magnitudes 4 , F newton act at a point and the measure of their included angle is 135° Given that their resultant makes angle 45° with the force F , find F and the magnitude of their resultant.

Third question

Resolve a force 100 newton in two directions the first inclines by 60° to the force and the other by 30° in the other side of the given force.

Total mark

Quiz**3**

till lesson 3 – unit 1

10**Answer the following questions :****First question****4 marks**

1 mark for each item

Choose the correct answer from those given :

- (1) A body of weight (W) is placed on an inclined plane makes angle of measure θ to the horizontal then the component of its weight in direction of line of greatest slope equals
- (a) $W \cos \theta$ (b) $W \sin \theta$ (c) $W \tan \theta$ (d) W
- (2) Two perpendicular forces of magnitude 12 newton , 5 newton act at a point , then the magnitude of their resultant = newton.
- (a) 17 (b) 7 (c) 13 (d) 14
- (3) Given : $\vec{F}_1 = 3\hat{i} - 2\hat{j}$, $\vec{F}_2 = a\hat{i} + \hat{j}$, $\vec{F}_3 = 4\hat{i} - b\hat{j}$ and their resultant $\vec{R} = 6\hat{i} - 4\hat{j}$, then $a + b =$
- (a) 2 (b) -2 (c) zero (d) -1
- (4) Given : $\vec{F}_1 = 5\hat{i}$, $\vec{F}_2 = 7\hat{i} - 5\hat{j}$, \vec{R} is their resultant then $\|\vec{R}\| =$
- (a) $\sqrt{5} + \sqrt{74}$ (b) 49 (c) 13 (d) $\sqrt{12} - \sqrt{5}$

Second question**3 marks**

Three coplanar forces of magnitudes 85 , 75 , $50\sqrt{2}$ kg.wt. act at a point , the first acts towards East , the second towards 30° West of the North and the third towards West South. Find the magnitude of their resultant.

Third question**3 marks**

Two forces act at a point , the maximum value of their resultant is 32 kg.wt. and the minimum value of their resultant is 12 kg.wt. Find the magnitude of each force , then find the magnitude of their resultant when the angle between the two forces = 60°

Total mark

Quiz**4**

till lesson 4 – unit 1

10**Answer the following questions :****First question****4 marks**

1 mark for each item

Choose the correct answer from those given :

- (1) Three equal forces in magnitudes act at a point and the forces are in equilibrium , then the measure of the angle between any two forces =
 (a) 60° (b) 90° (c) 120° (d) 150°
- (2) The maximum and minimum value respectively of the resultant of the two forces of magnitudes 8 , 13 newton are newton.
 (a) 13 , 8 (b) 13 , 5 (c) 21 , 8 (d) 21 , 5
- (3) Two forces act at a point of magnitudes 5 , 3 newton and the measure of the angle between them is 60° then the magnitude of their resultant (R) equals newton.
 (a) 2 (b) 7 (c) 8 (d) 5
- (4) Two forces of equal magnitudes , the magnitude of their resultant is 3 newton and the measure of the angle between them is $\frac{\pi}{3}$, then the magnitude of each newton.
 (a) $\sqrt{3}$ (b) 3 (c) $\frac{3}{2}$ (d) $3\sqrt{3}$

Second question**3 marks**

A body of weight 300 gm.wt. is placed on a smooth plane inclined to the horizontal with an angle whose tangent equals $\frac{1}{\sqrt{3}}$. The body is prevented from sliding by a force makes with the line of the greatest slope an angle of measure 30° upwards.

Find the magnitude of the force and the reaction of the plane.

Third question**3 marks**

If $\vec{F}_1 = 5\hat{i} + 3\hat{j}$, $\vec{F}_2 = a\hat{i} + 6\hat{j}$, $\vec{F}_3 = -14\hat{i} + b\hat{j}$ are three coplanar forces meeting at a point and their resultant is $\vec{R} = (10\sqrt{2}, \frac{3\pi}{4})$, then find the values of a and b

Quiz**5**

till lesson 5 – unit 1

10**Answer the following questions :****First question**

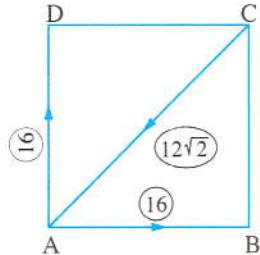
2 marks

The magnitudes of two forces F , $\sqrt{2}F$ newton act at a point and their resultant is perpendicular to the first force. Find the angle between the two forces and prove that the magnitude of their resultant equals F

Second question

2 marks

The opposite figure represents the forces 16, 16, $12\sqrt{2}$ newton which act in the square ABCD in the directions \overrightarrow{AB} , \overrightarrow{AD} , \overrightarrow{CA} respectively. Find the magnitude and direction of their resultant.

**Third question**

4 marks

A smooth sphere of radius length 30 cm. and of weight 10 gm.wt. rests on a vertical smooth wall. It is suspended by a string of length 30 cm., one of its ends is attached to a point on the surface of the sphere and the other end is fixed at a point on the wall above the tangency point of the sphere and the wall.

Find the magnitudes of the tension in the string and the reaction of the wall

Fourth question

2 marks

Three coplanar forces of magnitudes 5, 10, $4\sqrt{7}$ newton act at a point, the measure of the angle between the first two forces equals 60° , find the greatest and the smallest magnitude of their resultant.

Quiz

1

on lesson 1 – unit 2

Total mark

10

Answer the following questions :**First question**

5 marks

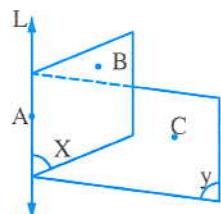
1 mark for each item

Choose the correct answer from those given :

- (1) All the following cases determine a plane except
- (a) a straight line and a point not on it. (b) two different parallel straight lines.
 (c) two intersecting straight lines. (d) two skew straight lines.
- (2) The number of planes which passes through 3 non-collinear points equals
- (a) 1 (b) 3 (c) 6 (d) infinite numbers.
- (3) The skew lines
- (a) never intersect. (b) are not perpendicular.
 (c) are not parallel. (d) are neither parallel nor intersecting.
- (4) In the opposite figure :

The plane $X \cap$ the plane $Y \cap$ the plane $ABC = \dots$

- (a) $\{A\}$ (b) the straight line L
 (c) \overleftrightarrow{AC} (d) \overleftrightarrow{AB}



- (5) If $\overrightarrow{AB} \parallel$ plane X , then $\overrightarrow{AB} \cap X = \dots$

- (a) \overline{AB} (b) \overleftrightarrow{AB} (c) \overleftrightarrow{AB} (d) \emptyset

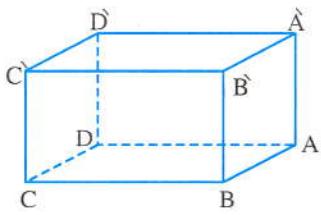
Second question

5 marks

1 mark for each item

By using the opposite figure state :

- (1) Two parallel planes.
 (2) Two intersecting planes.
 (3) Two skew straight lines.
 (4) A straight line and a plane which are parallel.
 (5) The intersection line of the plane $ABB\bar{A}$ with the plane ACD



Quiz**2**

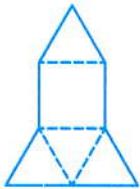
till lesson 2 – unit 2

Total mark**10****Answer the following questions :****First question****4 marks**

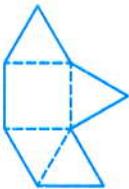
1 mark for each item

Choose the correct answer from those given :

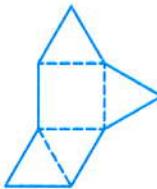
(1) Which of the following nets does not make a regular quadrilateral pyramid when it folded ?



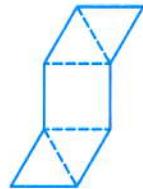
(a)



(b)



(c)



(d)

(2) The volume of a regular quadrilateral pyramid 12 cm^3 and its height 4 cm. then the length of its base side = cm.

(a) 1

(b) 2

(c) 3

(d) 4

(3) A regular quadrilateral pyramid , the length of its base side is 10 cm. , and its lateral height is 13 cm. , then its volume in cm^3 =(a) $\frac{1}{2} \times (10)^2 \times 13$ (b) $\frac{1}{3} \times (10)^2 \times 12$ (c) $\frac{1}{2} \times (12)^2 \times 13$ (d) $\frac{1}{3} \times (13)^2 \times 10$ (4) If the sum of edge lengths of a triangular regular faces pyramid equals 18 cm. , then its total area = cm^2 .(a) $\frac{27\sqrt{2}}{4}$ (b) $\frac{27\sqrt{3}}{4}$ (c) $\frac{27\sqrt{3}}{2}$ (d) $9\sqrt{3}$ **Second question****3 marks** $1\frac{1}{2}$ marks for each itemThe side length of the base of regular quadrilateral pyramid is 20 cm. and its height is $10\sqrt{3}$ cm.

Find : (1) The lateral area. (2) The volume of the pyramid.

Third question**3 marks**A regular hexagonal pyramid , the side length of its base = 12 cm. and its slant height = $10\sqrt{3}$ cm. Find its total area.

Quiz**3**

till lesson 3 – unit 2

Total mark**10****Answer the following questions :****First question****4 marks****1 mark for each item****Choose the correct answer from those given :**

- (1) The lateral area of a right cone whose base radius length is 6 cm.

and its height = 8 cm. is cm^2 .

- (a) 60π (b) 28π (c) 10π (d) 48π

- (2) A regular quadrilateral pyramid of base side length 10 cm. and its lateral height 13 cm. ,
its lateral area =

- (a) 260 cm^2 (b) 360 cm^2 (c) 130 cm^2 (d) 520 cm^2

- (3) The number of planes passes through 3 collinear points is
- (a) zero (b) 1 (c) 3 (d) infinite.

- (4) The volume of a regular quadrilateral pyramid whose base perimeter 36 cm. and its
height 10 cm. equals cm^3 .
- (a) 810 (b) 180 (c) 360 (d) 270

Second question**3 marks**

The base length of a regular quadrilateral pyramid is 18 cm. , its volume is 1296 cm^3 ,
Find its lateral height and its lateral area.

Third question**3 marks**

Find the radius length of the base of right circular cone whose total area $616\pi \text{ cm}^2$ and
the length of its drawer is 30 cm.

Total mark

Quiz**4**

till lesson 4 – unit 2

10*Answer the following questions :***First question**

4 marks

1 mark for each item

Choose the correct answer from those given :

(1) The centre of the circle : $x^2 + y^2 - 6x + 8y = 0$ is the point

- (a) (3, -4) (b) (4, -3) (c) (-3, 4) (d) (-4, 3)

(2) The circumference of a circle whose equation : $(x - 3)^2 + (y + 2)^2 = 25$ equals

- (a) 2π (b) 3π (c) 10π (d) 25π

(3) The lateral area of a right cone whose base radius length 6 cm. and its height 8 cm. equals cm².

- (a) 60π (b) 28π (c) 40π (d) 48π

(4) The point which lies on the circle : $(x - 2)^2 + y^2 = 13$

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

Second question

3 marks

Find the general form of the circle whose centre (-2, 5) and passes through (3, 2)

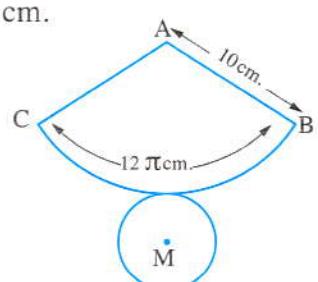
Third question

3 marks

The opposite figure represents the net of a solid where $\widehat{BC} = 12\pi$ cm.

, AB = 10 cm. , calculate :

- (1) The total area of this solid.
 (2) The volume of the solid.



Monthly Tests

FIRST

Monthly tests of October.

SECOND

Monthly tests of November.



Contents of October

Statics

- From : Unit (1) - Lesson (1) :
Forces - Resultant of two
forces meeting at a point.

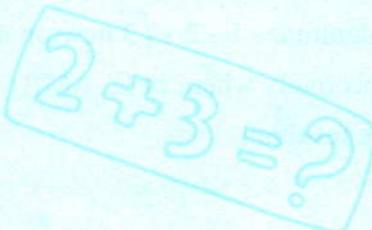
To : Unit (1) - Lesson (3) :
Resultant of coplanar forces
meeting at a point.

Contents of November

Lessons

- From : Statics : Equilibrium of rigid
body under the effect of two/
three forces meeting at a point.

To : Geometry : Total surface area
of pyramid and cone.



Test

1

Total mark _____

10

1 Choose the correct answer from the given ones : (6 marks)

(1) Two forces of magnitudes 8 and 16 kg.wt. and the measure of their included angle is 120° If these two forces act at a body , then the direction of motion of the body makes an angle of measure with the smaller force.

- (a) 30° (b) 90° (c) 60° (d) 45°

(2) Two forces of equal magnitude and intersecting at a point. The measure of the angle between the two forces is 120° and the magnitude of each is 6 N. , then the magnitude of their resultant = N.

- (a) 12 (b) $6\sqrt{3}$ (c) 6 (d) $12\sqrt{3}$

(3) F N. and K N. are the magnitudes of two forces where $F > K$ If the smallest and the greatest value of their resultant are 5 , 9 newton respectively , then $5F - 2K = \dots$ N.

- (a) 53 (b) 31 (c) 49 (d) 4

(4) A body of weight 20 N. is placed on a smooth inclined plane makes an angle of measure 30° with the horizontal , then the component of the weight in direction perpendicular to the plane = N.

- (a) 10 (b) 20 (c) $10\sqrt{2}$ (d) $10\sqrt{3}$

(5) Forces of magnitudes 8 , $4\sqrt{3}$, $6\sqrt{3}$, 14 newton act at a point. The measure of the angle between the first and second force is 30° and between the second and third is 120° and between the third and fourth is 90° in one cyclic order , then the magnitude of their resultant =

- (a) 4 (b) 6 (c) 8 (d) 7

(6) Two forces of magnitudes 3 , F newton and measure of the angle between them is $\frac{2\pi}{3}$ if their resultant is perpendicular to the first force , then $F = \dots$ newton.

- (a) 1.5 (b) 3 (c) $3\sqrt{2}$ (d) 6

2 Answer the following questions :

(1) A force of magnitude 18 newton acts in south direction. Find its two components in directions of 60° East of South and 30° West of South. (2 marks)

(2) Three coplanar forces of magnitudes 1 , 2 , $\sqrt{3}$ newton act at M , their directions are \overrightarrow{MA} , \overrightarrow{MB} and \overrightarrow{MC} respectively where $m(\angle AMB) = 60^\circ$, $m(\angle BMC) = 30^\circ$, $m(\angle AMC) = 90^\circ$ Find the resultant. (2 marks)

Test**2****Total mark****10****1 Choose the correct answer from the given ones :****(6 marks)**

(1) The resultant of two forces 6 , 8 newton is 10 N. , then the measure of the angle between their directions =°

- (a) 60 (b) 90 (c) 120 (d) 150

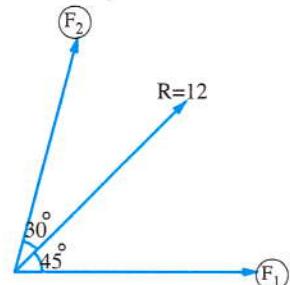
(2) Two forces intersecting at a point , their magnitudes 7 and F newton and their resultant bisects the angle between them , then $(F - 1)$ = N.

- (a) 8 (b) 7 (c) 6 (d) 5

(3) In the opposite figure :

The force \vec{R} is resolved into two components \vec{F}_1 and \vec{F}_2 , then F_1 = newton.

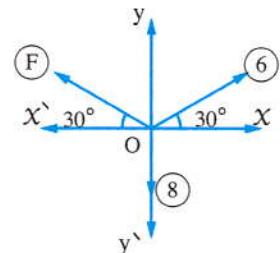
- (a) $12 \cos 75^\circ$ (b) $12 \cos 45^\circ$
 (c) $6 \csc 45^\circ$ (d) $6 \csc 75^\circ$



(4) In the opposite figure :

If the resultant of the shown forces acts in direction of y-axis , then F = N.

- (a) 2 (b) 6
 (c) 8 (d) 14

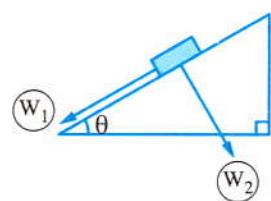


(5) The magnitudes of two forces are 5 and 10 newton and their resultant is perpendicular on the smaller force. If the measure of angle between the two forces is α and their resultant is R , then

- (a) $\alpha = 60^\circ$, $R = 10\sqrt{3}$ N. (b) $\alpha = 120^\circ$, $R = 10\sqrt{3}$ N.
 (c) $\alpha = 60^\circ$, $R = 5\sqrt{3}$ N. (d) $\alpha = 120^\circ$, $R = 5\sqrt{3}$ N.

(6) In the opposite figure :

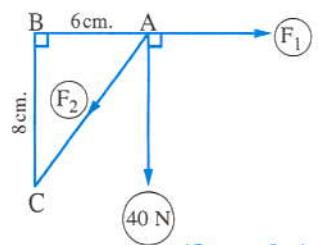
A body of weight 260 gm.wt. and $\tan \theta = \frac{5}{12}$, W_1 , W_2 are magnitudes of the two components in direction of the inclined plane downward and perpendicular to the plane , then



- (a) $W_1 = 120$ gm.wt. , $W_2 = 50$ gm.wt. (b) $W_1 = 260$ gm.wt. , $W_2 = 65$ gm.wt.
 (c) $W_1 - W_2 = 70$ gm.wt. (d) $W_1 + W_2 = 340$ gm.wt.

2 Answer the following questions :**(1)** In the opposite figure :

If the force of magnitude 40 N. is resolved into two components \vec{F}_1 and \vec{F}_2 as shown in the figure.
 Find the two component magnitudes F_1 , F_2



(2 marks)

(2) The magnitudes of three forces are 10, 20, 30 newton acting at one point. The first acts due east, the second makes an angle of measure 30° west of the north and the third makes an angle of measure 60° south of the west. Find the magnitude and the direction of their resultant.

(2 marks)

1 Choose the correct answer from the given ones :

(6 marks)

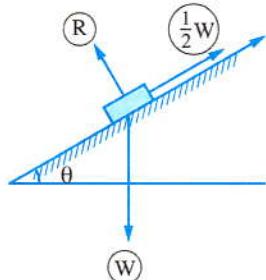
(1) The radius length of the base of a right circular cone = 5 cm. and its total surface area = $90\pi \text{ cm}^2$, then its volume = cm^3

- (a) 105π (b) 95π (c) 100π (d) 120π

(2) In the opposite figure :

If the body is in equilibrium under action of the shown forces , then $m(\angle \theta) = \dots$

- (a) 30° (b) 60°
 (c) 45° (d) 15°

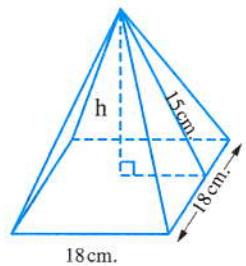


(3) In the opposite figure :

The volume of the regular quadrilateral pyramid in which the side length of its base = 18 cm.

and the slant height = 15 cm. is cm^3

- (a) 1296 (b) 1620
 (c) 540 (d) 1944



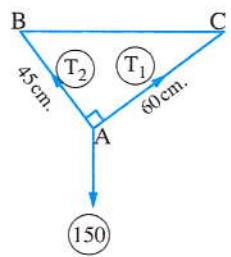
(4) Which of the following statements is not true ?

- (a) Any two points in the space have only one plane passing through them.
 (b) Any three non-collinear points in the space determine a plane.
 (c) The vertices of a triangle determine a plane.
 (d) Every two intersecting straight lines are contained in one plane.

(5) In the opposite figure :

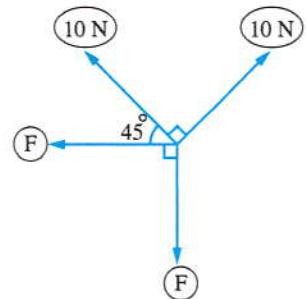
A body of weight 150 gm. wt. is in equilibrium by suspended by two perpendicular strings their lengths are 60 cm. , 45 cm. and the other ends are fixed at C and B on the same horizontal line , then $T_2 - T_1 = \dots$ gm.wt.

- (a) 120 (b) 90 (c) 60 (d) 30



(6) In the opposite figure :

The condition of equilibrium of the given forces is



- (a) $F = 10$ newton.
- (b) $F = 10\sqrt{2}$ newton.
- (c) $F = 5\sqrt{2}$ newton.
- (d) the system can not be in equilibrium.

2 Answer the following questions :

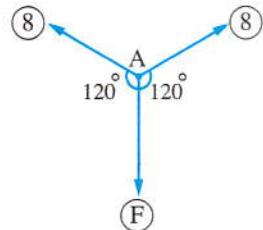
- (1) A regular quadrilateral pyramid , the side length of its base = 40 cm. , and its slant height is 25 cm. , **find :** (2 marks)
- (1) Height of the pyramid.
 - (2) The lateral surface area.
 - (3) The total surface area.
 - (4) Its volume.
- (2) \overline{AB} is a uniform rod with length 60 cm. and weight 40 newton is connected to a hinge on the vertical wall at A. If the rod kept in equilibrium horizontally by a light string connected to the rod at B and with point C on the wall above A and at a distance 60 cm. from A. Find the tension in the string and magnitude of the reaction of the hinge at A. (2 marks)

Test**2****Total mark****10****1** Choose the correct answer from the given ones :

(6 marks)

(1) In the opposite figure :

Particle A is kept in equilibrium under action of the three forces , as shown in the figure , where \vec{F} is in equilibrium with two forces each of magnitude 8 N. and it makes with each an angle of measure 120° , then $F = \dots \text{N.}$



- (a) zero (b) 8 (c) 16 (d) $8 \sin 120^\circ$

(2) Volume of a regular quadrilateral pyramid is 400 cm^3 and its height is 12 cm. , then its lateral surface area = cm^2

- (a) 240 (b) 260 (c) 300 (d) 360

(3) The total surface area of a right circular cone which its drawer length equal the diameter length of its base is

- (a) $4\pi r^2$ (b) $3\pi r^2$ (c) $3\pi r^3$ (d) $4\pi r^3$

(4) Any three non-collinear points identify

- (a) 1 plane. (b) 2 planes. (c) 3 planes. (d) 4 planes.

(5) A body of weight (W) newton is placed on a smooth plane inclined with the horizontal at an angle of measure 30° and kept in equilibrium by a force of magnitude 36 newton acts in the direction of the line of greatest slope of the plane upwards , then the magnitude of the weight = newton.

- (a) 36 (b) $72\sqrt{3}$ (c) 72 (d) $36\sqrt{3}$

(6) A body of weight 32 newton is suspended at the end of a string with length 10 cm. and the other end of the string is fixed at a point on a vertical wall and the body is pulled by horizontal force to make the body in equilibrium when it is at a distance 6 cm. from the wall , then the magnitude of this force = newton.

- (a) 24 (b) 40 (c) 36 (d) 28

2 Answer the following questions :

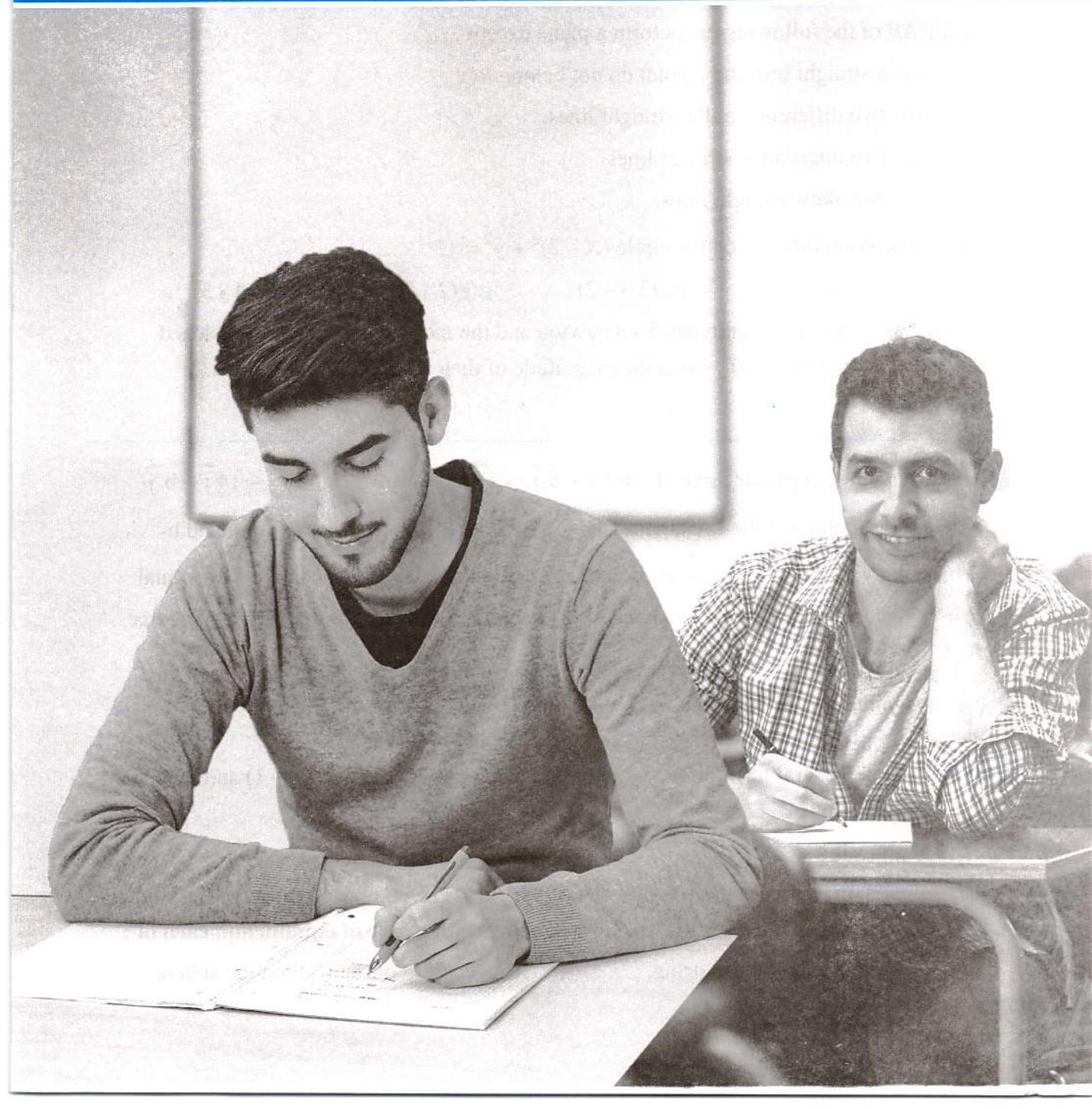
(1) The area of base of a right circular cone is $36\pi \text{ cm}^2$ and the length of its drawer is 10 cm. , **find its :**

- (1) Lateral surface area.
- (2) Total surface area.
- (3) Volume.

(2 marks)

(2) A weight of magnitude 200 gm.wt. is suspended by two strings of lengths 60 cm. and 80 cm. , from two points on the same horizontal line where the distance between them is 100 cm. Find the magnitude of tension in each string. **(2 marks)**

School Book Examination



School Book Examination

Answer the following questions :

- 1** Choose the correct answer from the given ones :

- (1) Two forces of magnitude 3 F , 2 F and the magnitude of their resultant is 5 F , then the measure of the angle enclosed between the two forces equals

- (a) zero° (b) 60° (c) 20° (d) 180°

- (2) All of the following cases form a plane except

- (a) a straight line and a point do not belong to it.
 - (b) two different parallel straight lines.
 - (c) two intersected straight lines.
 - (d) two skew straight lines.

- (3) The point that lies on the circle $(x - 2)^2 + y^2 = 13$

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

- (4) Two forces of magnitudes 5 , 3 newton and the measure of the angle enclosed between them is 60° , then the magnitude of their resultant R equals

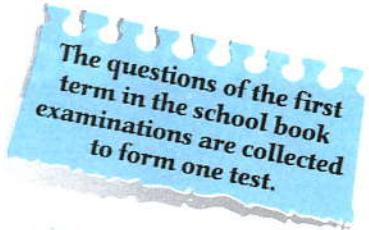
- 2 (a)** If the three coplanar forces $\vec{F}_1 = 5\hat{i} + 3\hat{j}$, $\vec{F}_2 = a\hat{i} + 6\hat{j}$, $\vec{F}_3 = -14\hat{i} + b\hat{j}$ act at a point and their resultant $\vec{R} = (10\sqrt{2}, \frac{3}{4}\pi)$ Find the values of a and b

- (b)** A body of weight 300 gm.wt. is placed on a smooth plane inclined to the horizontal with an angle whose tangent equals $\frac{1}{\sqrt{3}}$ the body is prevented from sliding by a force form with the line of the greatest slope an angle of measure 30° upwards. Find the magnitude of the force and the reaction of the plane.

- 3 (a)** Find the general form of the equation of a circle whose centre $(2, -1)$ and the length of its radius is 3 cm.

- (b)** A uniform smooth sphere of weight 10 gm.wt. and radius length 30 cm. is hanged from a point on its surface by a light string of length 30 cm. and the other end of the string is fixed in a point on a vertical smooth wall. Find in the case of equilibrium each of :

- (1) The tension in the string. (2) The reaction of the wall on the sphere.



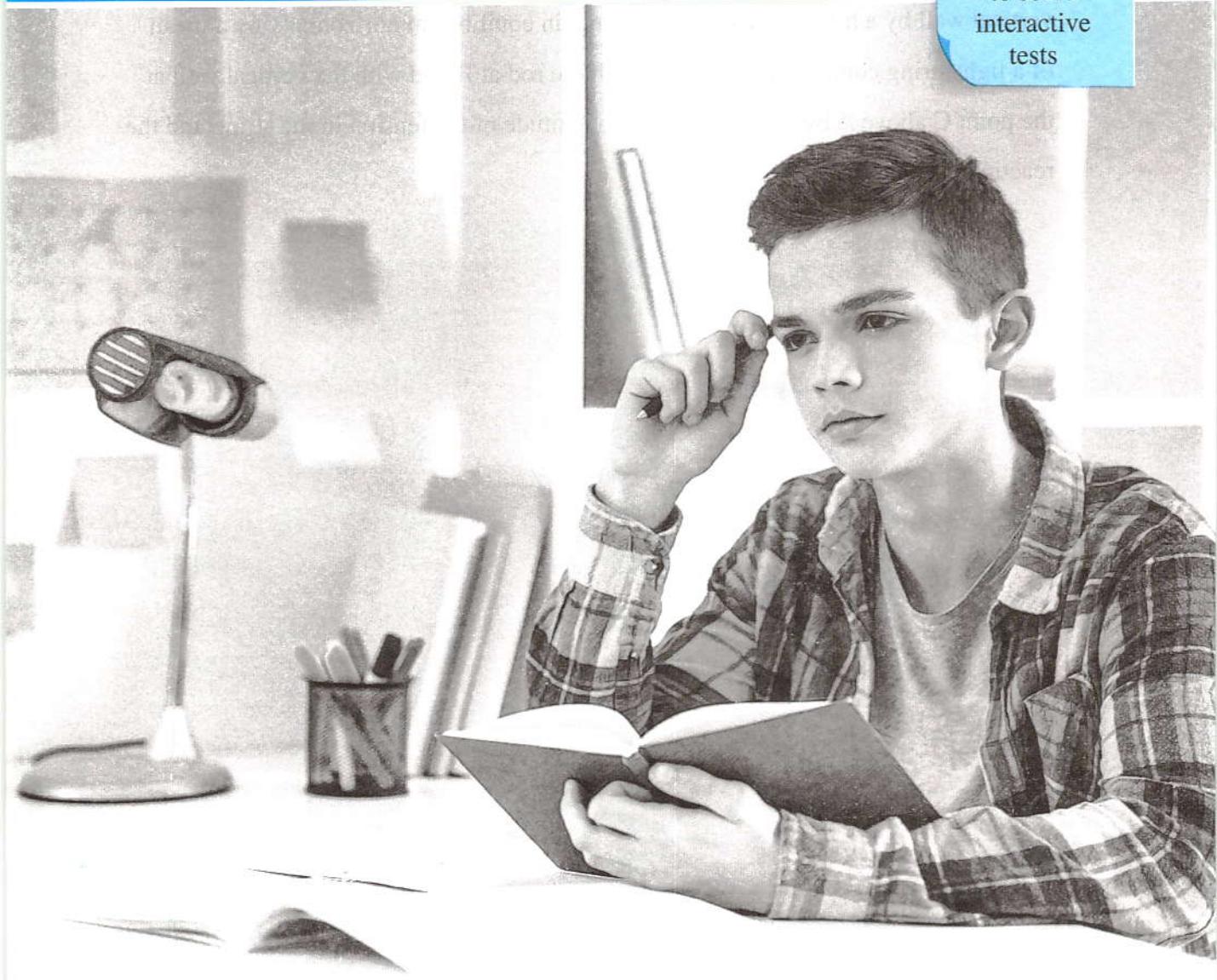
- 4 (a)** A cube of wax with edge length 30 cm. transfer into a right circular cone of height 45 cm. Find the length of the radius of the base of the cone , if 8 % of the wax loss during milting and transferring processes.
- (b)** A uniform rod of length 100 cm. and weight 150 gm.wt. is suspended freely from its ends by two strings and the other ends of the strings are fixed in one point. If the lengths of the two strings are 80 cm. , 60 cm. , find the tension in the two strings.
-
- 5 (a)** ABCDEF is a uniform hexagon , the forces of magnitudes 8 , $6\sqrt{3}$, 5 and $4\sqrt{3}$ newton act on \overrightarrow{AB} , \overrightarrow{AC} , \overrightarrow{AD} , \overrightarrow{AE} respectively. Find the magnitude and the direction of their resultant.
- (b)** \overline{AB} is a uniform rod with length 40 cm. and weight 30 newton is attached with a vertical wall by a hinge at A , the rod is kept in equilibrium horizontally by a mean of a light string connected by its ends with the rod at B and with the vertical wall at the point C above A by 40 cm. Find the magnitude of the tension in the string and the reaction of the hinge at A

Final Examinations

some school examinations.



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to solve
interactive
tests





First Multiple choice questions



Interactive
test 1

Choose the correct answer from the given ones :

- (1) Two forces of magnitudes 4 F , 5 F newton , their resultant 9 F newton , then the measure of the angle included between them =
(a) 0° (b) 90° (c) 180° (d) 120°

(2) Two perpendicular forces of magnitudes F , 12 newton , their resultant 13 newton , then F = N
(a) 5 (b) 12 (c) 1 (d) zero

(3) Two forces of magnitudes F , F newton , their resultant F newton , then the measure of the angle included between them =
(a) 90° (b) 120° (c) 180° (d) zero°

(4) Two forces of magnitude F , 6 newton , then their resultant perpendicular to the first force , the measure of the angle included between them 120° , then F =
(a) 3 (b) 6 (c) $6\sqrt{2}$ (d) 12

(5) Two forces of magnitude 3 , 5 newton , then their resultant \in
(a) $[3, 5]$ (b) $]3, 5[$ (c) $[2, 8]$ (d) $]2, 8[$

(6) A body of weight W is placed on a smooth inclined plane with the horizontal by an angle of measure θ , then its component in the direction of the line of greatest slope
(a) $W \sin \theta$ (b) $W \cos \theta$ (c) $W \tan \theta$ (d) $W \cot \theta$

(7) A force of magnitude 12 newtons acts in direction 30° North of the East , then its component in the East direction = newton.
(a) 6 (b) $6\sqrt{3}$ (c) 12 (d) 24

(8) Some coplanar forces meeting at a point , and the sum of their components in the direction of X-axis equal 3 newton and the sum of their components in direction of y-axis equal 4 newton , then their resultant = newton.
(a) 3 (b) 4 (c) 5 (d) 7

(18) A right cone , its lateral area $18\pi \text{ cm}^2$, its drawer length 6 cm. , then the length of radius of its base = cm.

- (a) 3 (b) 6 (c) 9 (d) 12

(19) If the equation of a circle $x^2 + y^2 = 36$, then its area = cm^2 .

- (a) 36 (b) 6π (c) 12π (d) 36π

(20) If the equation of a circle is $x^2 + y^2 + 4x - 6y - 10 = 0$, then its centre is

- (a) (4, -6) (b) (2, -3) (c) (-2, 3) (d) (-4, 6)

Second Essay questions

Answer the following questions :

- 1 A body of weight 12 newton is placed on an inclined plane with the horizontal by an angle of measure 30° , if the body kept in equilibrium under the action of a horizontal force. Find the magnitude of this force and the normal reaction of the plane.
- 2 A regular quadrilateral pyramid , the perimeter of its base = 40 cm. and its height 13 cm. find its volume.

2

Cairo Governorate

Shoubra Educational Zone
Mathematics Supervision

First Multiple choice questions



Choose the correct answer from the given ones :

Interactive test ②

- (1) Two forces of magnitudes 4 , 5 newton and the cosine of their included angle is $-\frac{2}{5}$, then the magnitude of their resultant = newton.

- (a) 15 (b) 9 (c) 5 (d) 13

- (2) If $\vec{F} = 3\vec{i} - 4\vec{j}$, then $\|\vec{F}\| =$ force unit.

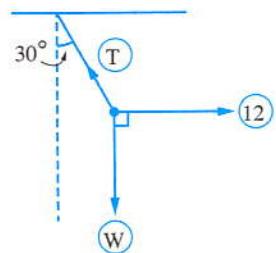
- (a) -1 (b) 5 (c) 7 (d) 25

- (3) A force of magnitude 12 newton , acts in the direction of 30° north of west and is resolved into two perpendicular directions , then the magnitude of its component in the west direction = newton.

- (a) 6 (b) 12 (c) $12\sqrt{3}$ (d) $6\sqrt{3}$

(4) In the opposite figure :

A body is suspended by the end of a string and its other end fixed at the ceiling of a room. A horizontal force of magnitude 12 gm.wt. pulled the body until the string inclines to the vertical by an angle of measure 30° , then the weight of the body = gm.wt.



- (a) $12\sqrt{3}$ (b) $3\sqrt{12}$ (c) 12 (d) 15

(5) If a body is in equilibrium under the action of three coplanar forces , meeting at a point and their magnitudes are 7 , 8 , 5 newton , then the measure of the angle between the second and the third forces =

- (a) 150° (b) 120° (c) 90° (d) 60°

(6) In the regular pyramid : the height the slant height.

- (a) $<$ (b) $>$ (c) \leq (d) \geq

(7) If the point (5 , 2) lies on the circle : $(x - 3)^2 + (y + a)^2 = 13$, then : a =

- (a) ± 5 (b) ± 1 (c) 5 or -1 (d) -5 or 1

(8) Two forces act at a point of magnitudes 2 F , 3 F newton and the magnitude of their resultant 5 F newton , then the measure of their included angle =

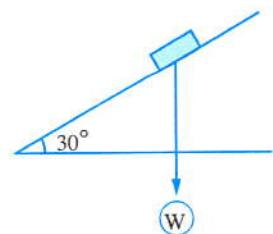
- (a) 0° (b) 60° (c) 120° (d) 180°

(9) If $\vec{F}_1 = 2\hat{i} + 3\hat{j}$, $\vec{F}_2 = \hat{i} + \hat{j}$, then the magnitude of their resultant = force unit.

- (a) $\sqrt{2}$ (b) $\sqrt{13}$ (c) 5 (d) 25

(10) In the opposite figure :

A body of weight (W) is placed on a smooth inclined plane inclines to the horizontal by an angle of measure 30° , then the component of its weight along the greatest slope of the plane is

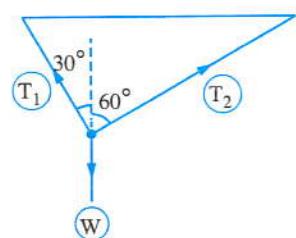


- (a) W (b) $W \sin 30^\circ$ (c) $W \cos 30^\circ$ (d) $W \tan 30^\circ$

(11) In the opposite figure :

A body of weight 36 kg.wt. is suspended by two strings incline to the vertical by angles of measures 30° , 60° , then : $T_1 + T_2 =$ kg.wt.

- (a) 45 (b) $9 + 18\sqrt{3}$
 (c) $36 + 18\sqrt{3}$ (d) $18(1 + \sqrt{3})$



(12) The least number of planes that determine a solid is

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

(13) If the side length of the base of a regular quadrilateral pyramid equals 40 cm.

and its height equals $20\sqrt{3}$ cm. , then its lateral surface area = cm²

- (a) 3200 (b) 4300 (c) 6300 (d) 3400

(14) The length of diameter of the circle whose equation is :

$4x^2 + 4y^2 + 16x - 8y - 16 = 0$ equals length unit.

- (a) 3 (b) 6 (c) 12 (d) 24

(15) Two forces act at a point their magnitudes are 7 , F newton and their resultant bisects the angle between them , then F = newton.

- (a) 49 (b) 14 (c) 7 (d) $7\sqrt{2}$

(16) Two forces of magnitudes 3 , F newton act at a point , include an angle of measure 120° and their resultant perpendicular to the first force , then F = newton.

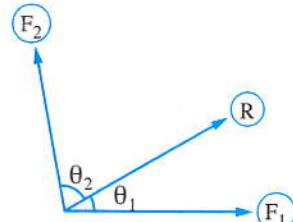
- (a) 0 (b) $3\sqrt{3}$ (c) 1.5 (d) 6

(17) In the opposite figure :

The force R is resolved into two components

F_1 , F_2 , then : $\frac{F_1}{F_2} = \dots$

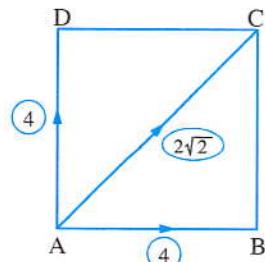
- (a) $\sin(\theta_1 + \theta_2)$ (b) $\frac{\sin \theta_2}{\sin \theta_1}$
 (c) $\frac{\sin \theta_1}{\sin \theta_2}$ (d) $\sin \frac{\theta_1}{\theta_2}$



(18) In the opposite figure :

ABCD is a square , the forces 4 , 4 , $2\sqrt{2}$ newton act in the directions of \overrightarrow{AB} , \overrightarrow{AD} , \overrightarrow{AC} respectively , then the magnitude of their resultant = newton.

- (a) 6 (b) $10\sqrt{2}$ (c) $6\sqrt{2}$ (d) $6\sqrt{3}$



(19) The two straight lines are skew if they are

- (a) Not contained in one plane (b) Not parallel
 (c) Not perpendicular (d) Not intersecting

(20) The volume of a right cone which the circumference of its base equals 44 cm.

and its height 15 cm. equals cm³. (where $\pi = \frac{22}{7}$)

- (a) 110 (b) 235 (c) 245 (d) 770

Second **Essay questions**

Answer the following questions :

- 1** A body of weight 100 gm.wt. is suspended by two strings of lengths 60 cm. , 80 cm. , the other two ends are fixed at two points on the same horizontal line and the distance between them equals 100 cm. Find the tension in each string in the equilibrium position.

2 Form the general equation of the circle in which \overline{AB} is diameter of it where :

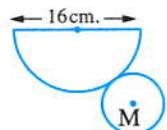


First Multiple choice questions



Interactive test ③

Choose the correct answer from the given ones :



(7) Two forces of magnitudes F and F act at a particle and the measure of the angle between them is 120° , then their resultant = newton.

- (a) $\sqrt{2} F$ (b) F (c) $2F$ (d) $2\sqrt{F}$

(8) A regular quadrilateral pyramid whose base perimeter is 36 and its height 10 cm., then its volume = cm^3 .

- (a) 180 (b) 270 (c) 360 (d) 810

(9) Two forces of magnitude 3 and F newton act at a point the measure of the angle between them is $\frac{2\pi}{3}$, if the resultant is perpendicular to the first force, then $F = \dots$ newton.

- (a) 6 (b) 3 (c) $\sqrt{2}$ (d) 6

(10) The difference between the greatest and smallest values of the resultant of two forces of magnitudes 5 and 8 newton =

- (a) 5 (b) 8 (c) 10 (d) 13

(11) If the radius length of the base of a right circular cone = 6 cm., and its height = 8 cm., then its lateral surface area = cm^2

- (a) 60π (b) 48π (c) 69π (d) 96π

(12) If the forces $\vec{F}_1 = a\hat{i} - 6\hat{j}$, $\vec{F}_2 = -3\hat{i} + 4\hat{j}$, $\vec{F}_3 = 9\hat{i} + 2\hat{j}$ are equilibrium, then $a = \dots$

- (a) 6 (b) -6 (c) 1 (d) 15

(13) A body of weight 6 newton is placed on a smooth plane inclined to the horizontal at an angle of measure 30° , it is kept in equilibrium by a horizontal force, then the magnitude of the reaction of the plane = N.

- (a) $2\sqrt{3}$ (b) $3\sqrt{3}$ (c) $4\sqrt{3}$ (d) $8\sqrt{3}$

(14) The circumference of the circle whose equation : $(x - 3)^2 + (y + 5)^2 = 25$ is length units.

- (a) 2π (b) 3π (c) 10π (d) 25π

(15) ABCD is a rectangle $AB = 4$ cm., $BC = 3$ cm., forces of magnitudes 4, 10, 6 newton. act along \overrightarrow{AB} , \overrightarrow{AC} , \overrightarrow{AD} respectively, the resultant of these forces makes with \overrightarrow{AB} an angle of measure

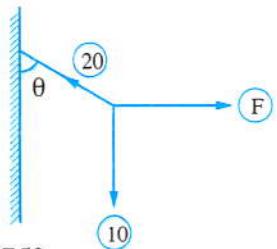
- (a) 45° (b) 60° (c) 30° (d) 90°

(16) Two forces of magnitudes 8 and 8 N, the measure of the angle between them is 60° , then the magnitude of their resultant is N

- (a) $8\sqrt{3}$ (b) 8 (c) $4\sqrt{3}$ (d) 4

(17) In the opposite figure :

A body of weight 10 N , is suspended by a string which inclines to the vertical by an angle of measure θ , it is in equilibrium under the effect of a horizontal force F , then $\theta = \dots$



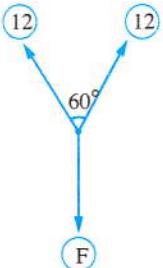
- (a) 30° (b) 45° (c) 60° (d) 75°

(18) If the total area of a triangular of pyramid of regular faces is $9\sqrt{3}$ cm² , then the length of its edge = cm.

- (a) 3 (b) 9 (c) 27 (d) $\sqrt{3}$

(19) In the opposite figure :

The system is in equilibrium , then $F = \dots$ newton.



- (a) $12\sqrt{2}$ (b) $12\sqrt{3}$ (c) 6 (d) 12

(20) Which of the following sets of forces could not be in equilibrium ?

- (a) 11 , 7 , 5 newton. (b) 4 , 6 , 8 newton.
 (c) 10 , 10 , 8 newton. (d) 8 , 4 , 14 newton.

Second Essay questions

Answer the following questions :

- 1** Find the equation of the circle whose centre is $(7, -5)$ and passes through the point $(3, -2)$
- 2** A uniform sphere of weight 24 newton and its radius length 6 cm. If it is in equilibrium by a string of length 4 cm. attached to a point of its surface and the other end of the string is fixed at a point in the vertical smooth wall. Find the tension of the string and the reaction of the wall.

4

Giza Governorate



Maths Inspection

First

Multiple choice questions



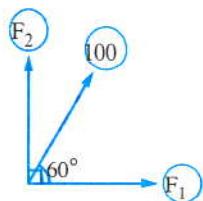
Interactive
test ④

Choose the correct answer from the given ones :

- (1)** Two equal forces in magnitude , the magnitude of their resultant = $7\sqrt{3}$ newton and the measure of the included angle is $\frac{\pi}{3}$, then the magnitude of each of them = newton.
 (a) 3 (b) $5\sqrt{3}$ (c) 5 (d) 7

(2) In the opposite figure :

If the force of magnitude 100 newton is resolved into two forces \vec{F}_1 and \vec{F}_2 and the force is measured by newton , then $(F_1, F_2) = \dots$



- (a) $(50, 50\sqrt{3})$ (b) $(50\sqrt{3}, 10)$ (c) $(50, 50)$ (d) $(10, 10)$

(3) If $\vec{F}_1 = 3\hat{i} + 2\hat{j}$, $\vec{F}_2 = a\hat{i} + 7\hat{j}$, $\vec{F}_3 = -12\hat{i} + b\hat{j}$ are three coplanar forces meeting at a point and the resultant $\vec{R} = (6\sqrt{2}, \frac{3}{4}\pi)$, then $a - b = \dots$

- (a) -3 (b) 3 (c) zero (d) 6

(4) The force which is in equilibrium with two perpendicular forces F , F newton makes with one of the two forces an angle of measure°

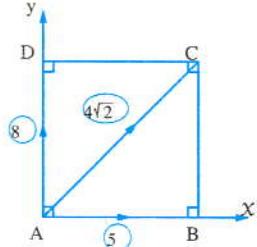
- (a) 90 (b) 120 (c) 135 (d) 150

(5) Two forces act at a point , the magnitude of the two forces are 6 , 3 newton and their resultant is perpendicular to one of them , then the magnitude of their resultant = newton.

- (a) 3 (b) $3\sqrt{3}$ (c) 6 (d) $6\sqrt{3}$

(6) In the opposite figure :

ABCD is a square , the forces of magnitudes 5 , 8 , $4\sqrt{2}$ newton act on \overrightarrow{AB} , \overrightarrow{AD} and \overrightarrow{AC} respectively , then the polar form of the resultant is



- (a) $(5, 54^\circ)$ (b) $(15, 60^\circ)$
 (c) $(15, 53^\circ 8)$ (d) $(13, 90^\circ)$

(7) A triangular regular faces pyramid , its edge length 10 cm. , then its total area equal cm²

- (a) 40 (b) 100 (c) $100\sqrt{3}$ (d) $25\sqrt{3}$

(8) If the length of the diameter of the base of a right circular cone is 12 cm. and its height 8 cm. , then its lateral area equal cm²

- (a) 60π (b) 28π (c) 10π (d) 48π

(9) The area of the circle whose equation is : $(x - 5)^2 + (y + 4)^2 = 7$ equals square unit.

- (a) 3.5π (b) 7π (c) 12.25π (d) 49π

(10) The equation of the circle whose centre (4, 3) and touches X-axis is

- | | |
|----------------------------------|----------------------------------|
| (a) $(x - 3)^2 + (y - 4)^2 = 16$ | (b) $(x - 4)^2 + (y - 3)^2 = 9$ |
| (c) $(x + 3)^2 + (y + 4)^2 = 9$ | (d) $(x + 3)^2 + (y - 4)^2 = 16$ |

(11) Two forces are equal in magnitude and each of them equal F newton if the magnitude of the resultant is F newton, then the measure of the included angle =

- | | | | |
|-------|----------------|----------------|-----------------|
| (a) 0 | (b) 30° | (c) 60° | (d) 120° |
|-------|----------------|----------------|-----------------|

(12) A force of magnitude $10\sqrt{2}$ newton acts in the direction of East it is resolved into two perpendicular components, one in the direction of eastern north, then the components of the force in the perpendicular direction is newton.

- | | | | |
|--------|--------|------------------|------------------|
| (a) 10 | (b) 20 | (c) $10\sqrt{3}$ | (d) $10\sqrt{2}$ |
|--------|--------|------------------|------------------|

(13) Three coplanar forces $\vec{F}_1 = 6\hat{i} + 7\hat{j}$, $\vec{F}_2 = a\hat{i} - 9\hat{j}$, $\vec{F}_3 = 5\hat{i} + b\hat{j}$ act at a particle and they are in equilibrium, then $a + 2b = \dots$

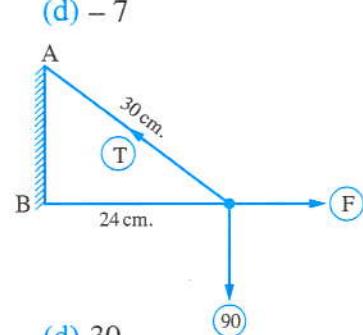
- | | | | |
|--------|-------|-------|--------|
| (a) -9 | (b) 5 | (c) 7 | (d) -7 |
|--------|-------|-------|--------|

(14) In the opposite figure :

A body of weight 90 gm.wt. is attached to the end of a string of 30 cm. long the body is pulled by a horizontal force.

It comes to equilibrium when it is 24 cm. apart from wall \overline{AB} , then $T - F = \dots$ gm.wt.

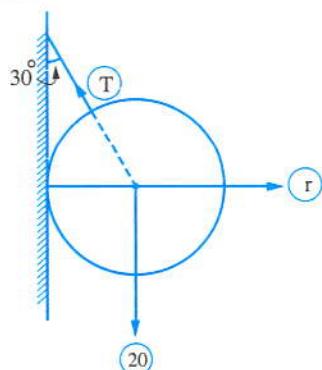
- | | | | |
|---------|---------|--------|--------|
| (a) 150 | (b) 120 | (c) 50 | (d) 30 |
|---------|---------|--------|--------|



(15) In the opposite figure :

A smooth sphere of weight 20 newton rests against a smooth vertical wall. It suspended at a point on its surface by means of a string and the other end is fixed to the wall at a point lies directly above the point of tangency of the sphere and the wall, if the string makes with the vertical an angle of measure 30° , then in case of equilibrium $T : r = \dots$

- | | | | |
|-------------|-------------|--------------------|--------------------|
| (a) $2 : 1$ | (b) $1 : 2$ | (c) $\sqrt{3} : 1$ | (d) $2 : \sqrt{3}$ |
|-------------|-------------|--------------------|--------------------|



(16) If $\vec{F}_1 = \hat{i} - \hat{j}$, $\vec{F}_2 = 2\hat{i} - 4\hat{j}$, $\vec{R} = 2a\hat{i} - 3b\hat{j}$, then $a + b = \dots$

- | | | | |
|-------|--------------------|--------------------|--------|
| (a) 3 | (b) $3\frac{1}{3}$ | (c) $3\frac{1}{6}$ | (d) 12 |
|-------|--------------------|--------------------|--------|

(17) If the total area of a triangular pyramid of regular faces = $36\sqrt{3}$ cm², then the sum of its edges lengths = cm.

- | | | | |
|-------|--------|--------|--------|
| (a) 6 | (b) 12 | (c) 18 | (d) 36 |
|-------|--------|--------|--------|

- (18) A right circular cone , the length of its drawer equals the length of the diameter of its base , then its total area = cm²
- (a) $3\pi r^2$ (b) $3\pi r^3$ (c) $4\pi r^2$ (d) $4\pi r^3$
- (19) Three equal forces in magnitude meeting at a point and they are in equilibrium , then the measure of the angle between each two forces =
- (a) 60° (b) 90° (c) 120° (d) 150°
- (20) Number of planes that are passing through two different parallel straight lines =
- (a) 1 (b) 2 (c) 3 (d) an infinite number.

Second Essay questions

Answer the following questions :

- 1 A regular quadrilateral pyramid whose base area is 9 cm^2 and the length of its lateral edge is 5 cm. Find its volume.
- 2 A smooth sphere of weight 15 newton is on a smooth vertical wall and suspended by a light string from a point on its surface. The other end of the string is attached to a point on the wall above the point of contact between the wall and the sphere. If the length of the string equals the radius length of the sphere. Find the pressure on the wall and the tension in the string in case of equilibrium.

5

Giza Governorate

Awseem Educational Directorate
Mathematics Inspection

First Multiple choice questions



Interactive test 5

Choose the correct answer from the given ones :

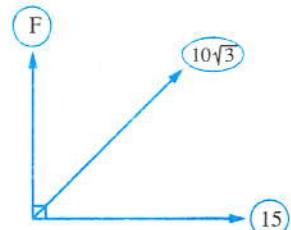
- (1) Two forces of magnitudes $2 F$, $5 F$ newton and the magnitude of their resultant is $3 F$ newton , then the measure of the angle between the two forces =°
- (a) zero (b) 60° (c) 90° (d) 180°
- (2) Two forces are of magnitudes $8 F$ gm.wt. and their resultant bisects the angle between them then F = gm.wt.
- (a) 4 (b) 16 (c) 2 (d) 8
- (3) Two forces of magnitudes $3 F$ newton and the measure of the angle between them is 120° and their resultant is perpendicular to the first force , then F = N
- (a) 1.5 (b) 3 (c) $3\sqrt{3}$ (d) 6

- (4) A force of magnitude 6 newton acts in the North direction is resolved into two perpendicular components , then its component in the Eastern North direction = newton.

(a) zero (b) 3 (c) $3\sqrt{2}$ (d) 6

- (5) In the opposite figure :

A force of magnitude $10\sqrt{3}$ newton is resolved into two perpendicular components , the magnitude of one of them is 15 newton , then the magnitude of the other component = newton.



(a) 5 (b) $5\sqrt{3}$ (c) 10 (d) 15

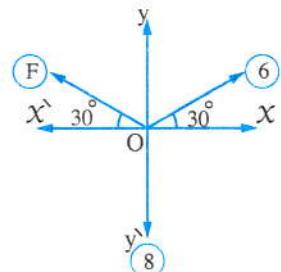
- (6) If the resultant of the two forces $\vec{F}_1 = 2\hat{i} - 2\hat{j}$, $\vec{F}_2 = 4\hat{i} - 8\hat{j}$ is $\vec{R} = 2a\hat{i} - 5b\hat{j}$, then $a + b = \dots$

(a) 3 (b) 2 (c) 5 (d) 1

- (7) If the resultant of the forces

in the opposite figure is in the direction of y-axis , then $F = \dots$ newton.

(a) 2 (b) 6 (c) 8 (d) 14



- (8) If three forces are equal in magnitude , meeting at a point and in equilibrium , then the measure of the angle between any two of them =

(a) 60° (b) 90° (c) 120° (d) 150°

- (9) Three forces are meeting at a point and are in equilibrium , if 7 , 3 are the magnitudes of two of them , then the magnitude of the third could be newton.

(a) 3 (b) 5 (c) 11 (d) 2

- (10) If the force of magnitude F is in equilibrium with the two forces of magnitudes 5 , 3 and enclosing an angle between them of measure 60° , then $F = \dots$ newton.

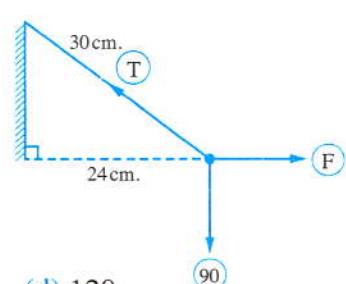
(a) $\sqrt{34}$ (b) $\sqrt{19}$ (c) 7 (d) 15

- (11) In the opposite figure :

A body of weight 90 gm.wt. is attached to a string of length 30 cm. the body is pulled by a horizontal force to be in equilibrium at a distance 24 cm.

from the wall , then $T = \dots$ gm.wt.

(a) 50 (b) 30 (c) 150 (d) 120



(12) The least number of unequal forces could be in equilibrium is

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

(13) If the force of magnitude F is in equilibrium with the two perpendicular forces of magnitudes 8 , 15 , then $F = \dots$ newton.

- (a) 7 (b) 21 (c) 23 (d) 17

(14) The number of planes that pass through two given points is

- (a) 1 (b) 2 (c) 3 (d) an infinite number.

(15) MABCD is a regular quadrilateral pyramid the side length of its base is 10 cm. and its height is 12 cm. , then its volume = cm^3

- (a) 300 (b) 400 (c) 450 (d) 120

(16) A regular quadrilateral pyramid of lateral surface area 30 cm^2 and its lateral height is 5 cm. , then the perimeter of its base is cm.

- (a) 12 (b) 24 (c) 36 (d) 40

(17) A right circular cone its base radius length is 6 cm. and the length of its drawer is 10 cm. , then its volume is cm^3

- (a) 32π (b) 64π (c) 96π (d) 288π

(18) A right circular cone its base radius length is 15 cm. and the length of its drawer is 25 cm. , then its lateral surface area is cm^2

- (a) 375π (b) 600π (c) 1500π (d) 1875π

(19) The centre of the circle : $x^2 + y^2 - 6x + 8y = 0$ is the point

- (a) (4 , -3) (b) (-3 , 4) (c) (3 , -4) (d) (-4 , 3)

(20) The circumference of the circle whose equation is : $x^2 + y^2 = 16$ is

- (a) 4π (b) 8π (c) 10π (d) 16π

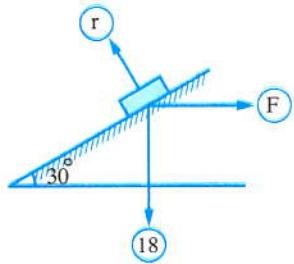
Second Essay questions

Answer the following questions :

1 In the opposite figure :

A body of weight 18 newton is placed on a smooth inclined plane to the horizontal at an angle of measure 30° is in equilibrium under the effect of a horizontal force \vec{F}

Find : the value of each of F , r



2 Write the general form of the equation of the circle whose center is (- 2 , 3) and the length of its diameter is 18 length units.



First

Multiple choice questions



Interactive test ⑥

Choose the correct answer from the given ones :

(1) If the resultant of two forces acting at a point reached its minimum value , then the measure of the angle between them =

- (a) zero° (b) 60° (c) 120° (d) 180°

(2) A triangular regular faces pyramid , its edge length l cm. , then the total surface area = cm²

- (a) l^2 (b) $\sqrt{3} l^2$ (c) $2\sqrt{3} l$ (d) $4 l^2$

(3) A body of weight 10 newton , is placed on a smooth plane inclines to the horizontal by an angle of measure 30° is kept in equilibrium by a force \vec{F} in direction of greatest slope upward , then the magnitude of the reaction of the plane on the body = newton.

- (a) 5 (b) $\frac{5\sqrt{3}}{2}$ (c) $10\sqrt{3}$ (d) $5\sqrt{3}$

(4) If two straight lines are parallel to the third in the space , then they are

- (a) perpendicular. (b) intersecting.
(c) parallel. (d) Not in the same plane.

(5) Two forces of magnitudes $(5 F + 30)$, $(7 F + 10)$ newton acting at a point and the resultant bisect the angle between the two forces then $F =$ newton

- (a) 10 (b) 30 (c) 40 (d) 4

(6) $\vec{F} = \left(6, \frac{2\pi}{3}\right)$, then $\|\vec{F}\| =$ unit of forces.

- (a) -2 (b) 1 (c) 6 (d) $\frac{2\pi}{3}$

(7) The length of the diameter of the circle : $2x^2 + 2y^2 + 8x - 4y - 8 = 0$ equals

- (a) 3 (b) 12 (c) 24 (d) 6

(8) The lateral surface area of a right cone the diameter length of its base = 10 cm. and its height = 12 cm. equals cm².

- (a) 65π (b) 120π (c) 65 (d) 120

(9) If we fold the sector its central angle is θ where $180^\circ > \theta > 0^\circ$ and L is cone drawer , r is radius length of its base cone , then

- (a) $L > 2r$ (b) $L = 2r$ (c) $L < 2r$ (d) $L < r$

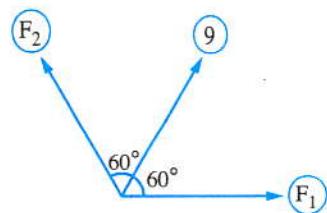
(10) In the opposite figure :

a force of magnitude 9 newton is resolved

into two component F_1 and F_2

, then $F_1 = \dots$ newton.

- (a) 4.5 (b) $4.5\sqrt{3}$ (c) 9 (d) 10



(11) The volume of the quadrilateral pyramid , where its base as rhombus of diagonals length 6 cm. , 5 cm. and its height 4 cm. equals cm³

- (a) 40 (b) 25 (c) 30 (d) 20

(12) The circumference of the circle of its equation : $(x - 3)^2 + (y + 2)^2 = 25$ equals length unit.

- (a) 2π (b) 3π (c) 10π (d) 25π

(13) $\vec{F}_1 = 4\hat{i} - 3\hat{j}$, $\vec{F}_2 (2, -7)$ and $\vec{F}_3 = -\hat{i} + 22\hat{j}$ and \vec{R} is their resultant , then $\|\vec{R}\| = \dots$

- (a) 13 (b) 5 (c) 12 (d) 17

(14) The resultant of the two perpendicular forces 6 newton and 8 newton is newton

- (a) 14 (b) 2 (c) 48 (d) 10

(15) If the ratio between the maximum and minimum value of the resultant of two forces is 3 : 2 , then the ratio between the two forces is

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

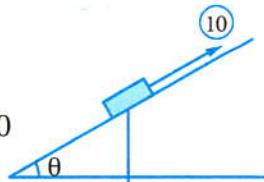
(16) Three forces are equals in magnitude and acting at a point and in equilibrium , then the measure of the angle between any two forces =°

- (a) 60 (b) 120 (c) 150 (d) 180

(17) In the opposite figure :

the body is placed on a smooth plane and it is kept in equilibrium by a force acting along the line of greatest slope upward of magnitude 10 , then the measure of $\theta = \dots$ °

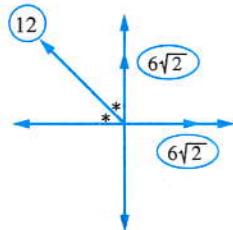
- (a) 30 (b) 45 (c) 60 (d) 75



(18) In the opposite figure :

The resultant is in direction of

- (a) South. (b) East. (c) West. (d) North.

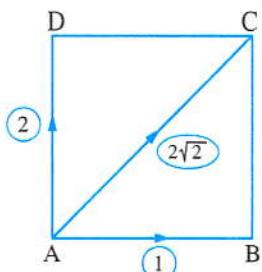


- (19) $\vec{F}_1 = 7\hat{i} - 4\hat{j}$, $\vec{F}_2 = k\hat{i} + 3\hat{j}$ and $\vec{F}_3 = -9\hat{i} + m\hat{j}$ and \vec{R} is their resultant and $\vec{R} = \left(5\sqrt{2}, \frac{\pi}{4}\right)$, then $m + k = \dots$

(a) 13 (b) 5 (c) 7 (d) 6

- (20) ABCD is a square, then the resultant is \dots

(a) $(5, 36^\circ 52')$
 (b) $(5, 53^\circ 8')$
 (c) $(5, 52^\circ 8')$
 (d) $(6, 36^\circ 52')$



Second Essay questions

Answer the following questions :

- The weight of a body is 200 gm.wt. It is tied by two perpendicular strings their lengths are 60 cm., 80 cm. and the other ends are fixed on the same horizontal line, find the difference between the tensions in the two strings.
- Determine the position of the circle $C_1 : (x - 5)^2 + (y + 2)^2 = 4$ with respect to the circle $C_2 : (x + 7)^2 + (y - 3)^2 = 1$

7

El-Kalyoubia Governorate



Maths Inspection



Interactive test 7

First Multiple choice questions

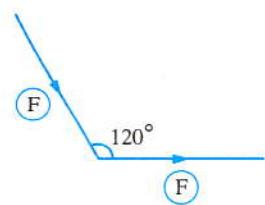
Choose the correct answer from the given ones :

- The magnitude of two forces are 2 F newton and 6 F newton and its resultant is 8 F newton, then the angle between them is \dots °
 (a) 0 (b) 60 (c) 90 (d) 180
- If \vec{R} is the resultant of the forces \vec{F}_1 and \vec{F}_2 , where $R \in [10, 22]$, $F_1 < F_2$, then $(F_1, F_2) = \dots$
 (a) $(10, 22)$ (b) $(6, 16)$ (c) $(12, 32)$ (d) $(5, 11)$
- The magnitude of two forces are 7 , F newton and their resultant bisects the angle between them, then $F = \dots$ newton.
 (a) $7\sqrt{2}$ (b) 3.5 (c) 7 (d) 14
- If \vec{R} is the resultant of the forces \vec{F}_1 and \vec{F}_2 where $\vec{R} \perp \vec{F}_2$, then $F_1^2 = \dots$
 (a) $R^2 - F_2^2$ (b) $F_2^2 - R^2$ (c) $R^2 + F_2^2$ (d) $R + F_2$

(5) In the opposite figure :

The resultant of two forces F and F is

- (a) $\frac{1}{2} F$ (b) F
 (c) $\sqrt{3} F$ (d) $\sqrt{5} F$



(6) A force of magnitude 20 newton act in direction 30° north of east is resolved into two perpendicular components , then the magnitude of its component in direction the east is

- (a) 10 (b) 20 (c) $10\sqrt{2}$ (d) $10\sqrt{3}$

(7) A body of weight 15 N. is placed on a smooth plane inclines to the horizontal by an angle of measure θ° , the body is kept in equilibrium by a horizontal force of magnitude $15\sqrt{3}$ N. , then $\theta = \dots^\circ$

- (a) 22.5 (b) 30 (c) 45 (d) 60

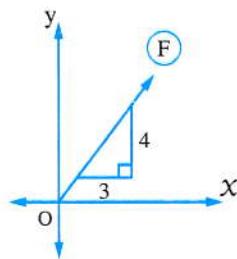
(8) If $\vec{F}_1 = 5\hat{i} + 2\hat{j}$, $\vec{F}_2 = a\hat{i} + 6\hat{j}$, $\vec{F}_3 = -14\hat{i} + b\hat{j}$, are three coplanar forces acting at a point and its resultant $\vec{R} = \left(10\sqrt{2}, \frac{3\pi}{4}\right)$, then $a + b = \dots$

- (a) -1 (b) 1 (c) 0 (d) 14

(9) In the opposite figure :

If the horizontal component of the force F is 60 newton , then the vertical component is newton.

- (a) 45 (b) 60 (c) 75 (d) 80



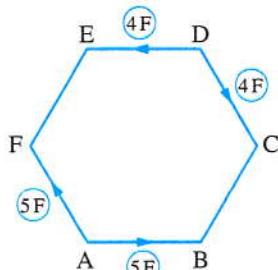
(10) Two forces the difference between their magnitudes 2 and the product of their magnitudes is 48 , and the magnitude of its resultant is $2\sqrt{13}$ newton , then the measure of the angle between their lines of action is $^\circ$

- (a) 90 (b) 120 (c) 135 (d) 150

(11) In the opposite figure :

ABCDEF is a regular hexagon , then the resultant of these forces act in direction

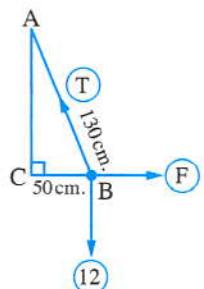
- (a) \overrightarrow{AD} (b) \overrightarrow{DA}
 (c) \overrightarrow{AC} (d) \overrightarrow{EA}



(12) In the opposite figure :

If the body B is in equilibrium
, then $T - F = \dots$

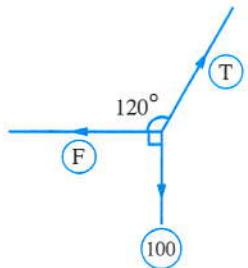
- (a) 18 (b) 12
(c) 8 (d) 5



(13) In the opposite figure :

If the forces are in equilibrium
, then $F + T = \dots N$

- (a) 300 (b) $300\sqrt{3}$
 (c) 100 (d) $100\sqrt{3}$



(14) If the points A , B and C represent a plane , then which of the following is always true ?

- (a) $AB = BC = CA$ (b) $AB + BC = CA$ (c) $AB + BC > CA$ (d) $AB + BC < CA$

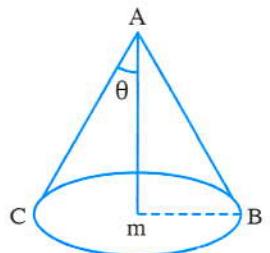
(15) If the total area of triangular pyramid of regular faces = $36\sqrt{3}$ cm², then the sum of its edges = cm.

(16) In the opposite figure :

If $\sin \theta = \frac{3}{5}$ and the height of the cone = 12 cm.

, then the total area of the cone = π cm².

- (a) 144 (b) 169
(c) 216 (d) 612



(17) The straight line $y = 2$ cuts the circle $(x - 3)^2 + (y - 2)^2 = 25$ in the two points A and B , then $AB = \dots$ length unit.

(18) The equation $(a - 1)x^2 + 2y^2 + (b - 3)x + (c - 4)y + (d - 5)xy + 2 = 0$ represents a circle its center $(3, -1)$, then $a + b + c + d = \dots$

- (a) 17 (b) 11 (c) 7 (d) 5

(19) If the Δ OAB is rotate complete rotation about X -axis where the equation of \overrightarrow{AB} is $\frac{x}{4} + \frac{y}{3} = 1$, then the volume of the resultant solid is π cm³.

- (a) $\frac{16}{3}$ (b) 16 (c) 12 (d) 6

(20) A regular quadrilateral pyramid the area of each of its lateral faces equals the area of its base , and the perimeter of the base is 24 cm. , then the volume of the pyramid = cm³.

(a) 36

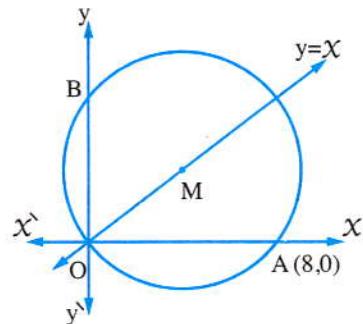
(b) $6\sqrt{3}$ (c) $36\sqrt{15}$ (d) $72\sqrt{3}$ **Second****Essay questions****Answer the following questions :**

- 1 The forces of magnitudes F , 6 , $4\sqrt{2}$, $5\sqrt{2}$ and K measured in newton are act at a point in the directions east , north , north west , west south and south respectively. Find the values of F and K if the resultant of forces = 2 newton act in north direction.

- 2 In the opposite figure :

A circle its center $M \in$ the straight line $y = x$

Find the equation of the circle.

**8****El-Monofia Governorate**

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First **Multiple choice questions**

Interactive test **8**

Choose the correct answer from the given ones :

- (1) Two perpendicular forces of magnitudes 12 newton , 5 newton , act at point , then the magnitude of their resultant

(a) 7

(b) 13

(c) 14

(d) 17

- (2) Two forces of equal magnitudes , enclosing between them an angle of measure $\frac{\pi}{2}$ if their resultant is 8 newton , then the value of each force is newton.

(a) 4

(b) 8

(c) $2\sqrt{2}$ (d) $4\sqrt{2}$

- (3) Three forces are equal in magnitude and meeting at a point are in equilibrium , then the measure of the angle between any two of them is°

(a) 60

(b) 90

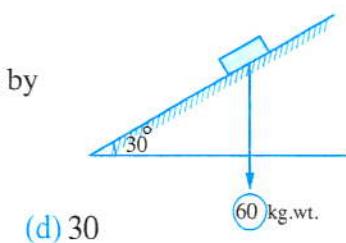
(c) 120

(d) 150

(4) In the opposite figure :

A body of weight 60 kg.wt. is placed on a smooth inclined plane by an angle of measure 30° with the horizontal , then the component in the perpendicular direction on the plane

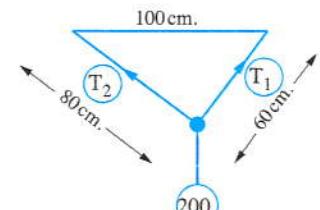
- (a) 60 (b) $30\sqrt{3}$ (c) $30\sqrt{2}$



(5) In the opposite figure :

A weight of a magnitude 200 gm.wt. is suspended by two strings of lengths 60 cm. and 80 cm. , from two points on one horizontal line where the distance between them is 100 cm. , then $T_1 - T_2 =$

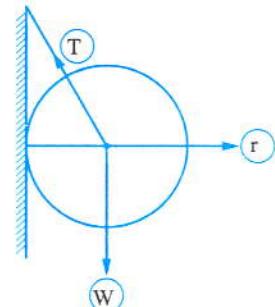
- (a) 160 (b) 120 (c) 80



(6) In the opposite figure :

A solid uniform sphere of weight 15 kg.wt. and radius length 5 cm. is in equilibrium by a string of length 5 cm. attached to a point of its surface and the other end of the string is fixed at a point in the vertical smooth plane above the tangency point
, then $\frac{r}{T} =$

- (a) $1 : 2$ (b) $1 : 3$ (c) $1 : \sqrt{2}$ (d) $1 : \sqrt{3}$



(7) $\vec{F}_1 = \hat{i} - \hat{j}$, $\vec{F}_2 = 2\hat{i} - 3\hat{j}$, then the magnitude of their resultant =

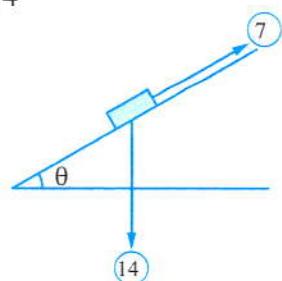
- (a) 12 (b) 7 (c) 5 (d) 4

(8) In the opposite figure :

The body equilibrium on a smooth inclined plane

, then : $\theta =$

- (a) 60 (b) 90
(c) 45 (d) 30



(9) Two forces meeting at a point their magnitudes 5 , 3 newton , then their resultant \in

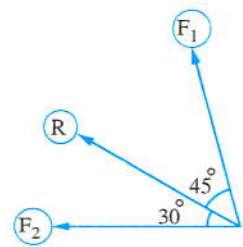
- (a) [2 , 8] (b)]2 , 8[(c) [2 , 8[(d)]2 , 8]

(10) In the opposite figure :

The resultant R = 12 newton

, then $F_1 =$

- (a) $12 \cos 75^\circ$ (b) $12 \csc 75^\circ$
(c) $6 \csc 75^\circ$ (d) $6 \cos 75^\circ$



- (11) Three coplanar forces meeting at a point are in equilibrium , the magnitude of two forces of them are 3 and 7 newton , then the magnitude of third could be newton.
- (a) 2 (b) 3 (c) 5 (d) 11
- (12) If three forces meeting at a point and acting up on a particle are equilibrium , then the magnitude of each force is proportional to the of the included angle between the two other force.
- (a) sin. (b) cosin. (c) tangent. (d) cotangent.
- (13) Two forces of magnitudes : $3F - 1$, $F + 5$ newton , if their resultant bisects the angle between them , then the value of $F =$ newton.
- (a) 2 (b) 3 (c) 4 (d) 5
- (14) A right circular cone , the length of its drawer 10 cm. and its height 8 cm.
, then the volume cm^3
- (a) 30π (b) 40π (c) 80π (d) 96π
- (15) A triangular pyramid of regular faces , length of its edge is 12 cm. , then its total surface area = cm^2
- (a) 144 (b) $144\sqrt{2}$ (c) $144\sqrt{3}$ (d) $144\sqrt{6}$
- (16) All the following cases determine a plane except
- (a) A straight line and a point does not belong to it.
(b) Two parallel and not coincident straight lines.
(c) Two intersecting straight lines.
(d) Two skew straight lines.
- (17) The point which lies on the circle : $(x - 3)^2 + (y - 4)^2 = 25$ is
- (a) (3 , 4) (b) (3 , 0) (c) (0 , 4) (d) (0 , 0)
- (18) A regular quadrilateral pyramid the perimeter of its base = 40 cm. and its height 12 cm.
, then lateral surface area = cm^2
- (a) 200 (b) 240 (c) 260 (d) 320
- (19) The solid formed from the rotation of a right-angle triangle a complete rotation about one of its right sides as an axis is called
- (a) cube. (b) pyramide. (c) cone. (d) cuboid.
- (20) The circumference of the circle whose equation : $(x - 3)^2 + (y + 2)^2 = 25$ is
- (a) 5π (b) 10π (c) 15π (d) 25π

Second Essay questions**Answer the following questions :**

- 1** ABCDHE is a regular hexagon. Forces of magnitudes $2, 4\sqrt{3}, 8, 2\sqrt{3}$ and 4 kg.wt. act at point A in directions $\overrightarrow{AB}, \overrightarrow{AC}, \overrightarrow{AD}, \overrightarrow{AH}, \overrightarrow{AE}$ respectively. Find the magnitude and the direction of their resultant.
- 2** Find the equation of the circle which the straight line : $3x + 4y + 23 = 0$ touches it and its centre is (1, 1).

9**EI-Dakahlia Governorate**

Maths Supervision

First Multiple choice questions

Interactive test (9)

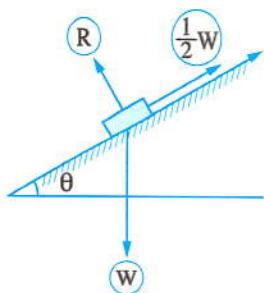
Choose the correct answer from the given ones :

- (1) The volume of the right cone is $27\pi \text{ cm}^3$ and the circumference of its base is $6\pi \text{ cm}$, then its height is cm.
 (a) 27 (b) 18 (c) 9 (d) 6
- (2) Right circular cone , area of its base = $25\pi \text{ cm}^2$, length of its drawer = 13 cm. , then its lateral area = cm^2 .
 (a) 50π (b) 65π (c) 90π (d) 100π
- (3) Two forces of magnitudes $8\sqrt{3}$ and 8 newton act at a point the angle between them of measure 150° , then the magnitude of the resultant of the two forces = newton.
 (a) 64 (b) 32 (c) 16 (d) 8
- (4) A ball of pendulum of weight 600 dyne is in equilibrium when the string makes an angle of measure 30° with the vertical under the effect of a force perpendicular to the string , then the magnitude of the force = dyne.
 (a) 1200 (b) 300 (c) $300\sqrt{2}$ (d) $300\sqrt{3}$
- (5) Force of magnitude $4\sqrt{2}$ acts in east direction it was resolved into two perpendicular component , then the magnitude of the component in direction of eastern north equals newton.
 (a) 4 (b) $4\sqrt{2}$ (c) 8 (d) $8\sqrt{2}$
- (6) If the equation of a circle is $(2a+1)x^2 + (a+2)y^2 + (b-1)xy - 6ax + 12by - 12 = 0$, then its radius length equals length unit.
 (a) 3 (b) 4 (c) 5 (d) 6

(7) In the opposite figure :

If the body is in equilibrium under acting forces , then $m(\angle \theta) = \dots$

- (a) 30° (b) 15°
 (c) 60° (d) 45°



(8) A uniform smooth sphere of weight 1.5 gm.wt. and radius length 25 cm.

is suspended at a point on its surface by a light string of length 25 cm. and the other end of the string is fixed at a point in vertical smooth wall , if the sphere is in equilibrium , then the tension in the string = gm.wt.

- (a) $2\sqrt{2}$ (b) $\sqrt{3}$ (c) 3 (d) 6

(9) If the resultant of two forces acting on point is zero , then the angle between them =

- (a) 180° (b) 0° (c) 45° (d) 90°

(10) If a force of magnitude (F) is in equilibrium with two forces of magnitudes 5 and 3 newton and the measure of the angle between them is 60° , then $F = \dots$ newton.

- (a) $\sqrt{19}$ (b) $\sqrt{34}$ (c) 7 (d) 15

(11) The equation of the circle which is the image of the circle : $x^2 + y^2 - 12x + 6y + 20 = 0$

by translation ($x+2$, $y-2$)

- (a) $x^2 + y^2 - 10x + 4y + 20 = 0$ (b) $x^2 + y^2 - 16x + 10y + 20 = 0$
 (c) $(x-8)^2 + (y+5)^2 = 25$ (d) $(x-6)^2 + (y+3)^2 = 20$

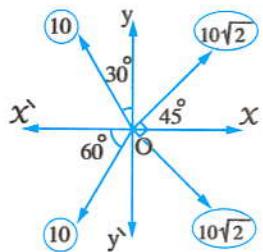
(12) Two forces F , F act at a particle and the magnitude of their resultant is F , then the measure of the included angle between the two forces =

- (a) 60° (b) 45° (c) 120° (d) 135°

(13) In the opposite figure :

The resultant of the system
of forces R = newton.

- (a) 20 (b) $10\sqrt{2}$
 (c) 10 (d) zero



(14) Three coplanar forces intersecting at one point and in equilibrium. If 3 N. and 7 N. are magnitudes of two forces of them , then the magnitude of the third force could be equals N.

- (a) 11 (b) 2 (c) 5 (d) 3

(15) The force \vec{R} is resolved into two forces \vec{F}_1, \vec{F}_2 which make with the force \vec{R} two angles of measure θ_1, θ_2 from two sides respectively , then the magnitude of $\vec{F}_1 = \dots$

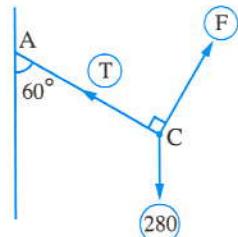
- (a) $\frac{R \sin \theta_1}{\sin(\theta_1 + \theta_2)}$ (b) $\frac{R \sin \theta_2}{\sin(\theta_1 - \theta_2)}$ (c) $\frac{R \sin(\theta_1 + \theta_2)}{\sin \theta_2}$ (d) $\frac{R \sin \theta_2}{\sin(\theta_1 + \theta_2)}$

(16) Two perpendicular forces of magnitudes 6 N. , 8 N. , then the sine of angle between the resultant and first force =

- (a) $\frac{3}{5}$ (b) $\frac{4}{5}$ (c) $\frac{3}{4}$ (d) $\frac{4}{3}$

(17) In the opposite figure :

A lamp of weight 280 gm.wt. is attached to the end of a string. It is in equilibrium under the effect of a force perpendicular to the string when it is inclined to the vertical by an angle of measure 60° , then $\frac{F}{T} = \dots$



- (a) 2 (b) $\frac{1}{2}$ (c) $\frac{1}{\sqrt{3}}$ (d) $\sqrt{3}$

(18) The center of the circle : $x^2 + y^2 - 6x + 8y = 0$ is the point

- (a) (3, -4) (b) (4, -3) (c) (-4, 3) (d) (-3, 4)

(19) The lateral surface area of the right cone whose base radius is 6 cm. and the height of the cone is 8 cm. equals = cm²

- (a) 28π (b) 10π (c) 60π (d) 48π

(20) The number of planes that could be passes through three non-collinear points is

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

Second Essay questions

Answer the following questions :

- 1 A metal sphere of weight 400 kg.wt acts in its centre , placed between two smooth planes , one of them is vertical and the other inclined at angle of measure 60° with vertical , then find the reaction of each plane.

- 2 A regular quadrilateral pyramid , the side length of its base is 18 cm. , if its volume is 1296 cm^3 . Find the slant height and lateral surface area.

10**Damietta Governorate****Maths Inspection****First****Multiple choice questions**Interactive
test 10**Choose the correct answer from the given ones :**

- (1) The resultant of two forces 6 newton and 8 newton could be newton.
 (a) 20 (b) 15 (c) 12 (d) 1
- (2) Two forces of equal magnitudes , enclosing between them an angle of measure $\frac{\pi}{2}$ if the magnitude of their resultant 8 newton , then the value of each force measured in newton is
 (a) $2\sqrt{2}$ (b) 4 (c) $4\sqrt{2}$ (d) 8
- (3) All different vertical straight lines in the space are
 (a) parallel. (b) skew.
 (c) contained in the same plane. (d) intersecting.
- (4) Two forces of magnitudes 3 , F newton and the measure of the angle between them is 120° . If their resultant is perpendicular to the first force , so the value of F in newton is
 (a) 1.5 (b) 3 (c) $3\sqrt{3}$ (d) 6
- (5) The magnitude of two perpendicular forces are $(2F - 5)$ and $(F + 2)$ newton and the magnitude of their resultant is $3\sqrt{5}$ newton , then $F = \dots$ newton.
 (a) 7 (b) 4 (c) 6 (d) 3
- (6) A regular quadrilateral pyramid whose volume is 480 cm^3 , and its base length is 12 cm. , then the length of its height = cm.
 (a) 10 (b) 20 (c) 30 (d) 15
- (7) Two forces of magnitudes $3F$ and F newton and their resultant is $4F$ newton , then the measure of the angle between them =°
 (a) 60 (b) 0 (c) 180 (d) 90
- (8) Two forces of magnitudes 4 and 6 newton the measure of the angle between them is 90° , then the tangent of the angle between the resultant and the first force equal
 (a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $2\sqrt{13}$ (d) $\frac{\sqrt{6}}{2}$

(9) If a body of weight (W) is placed on an inclined smooth plane makes an angle of measure (θ) with the vertical , then its weight component in direction of the plane is

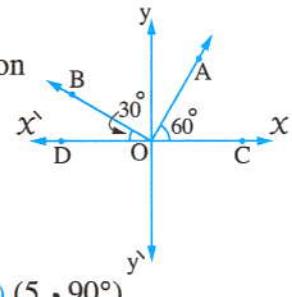
- (a) $W \sin \theta$ (b) $W \cos \theta$ (c) W (d) $W \tan \theta$

(10) The height of a right circular cone is 6 cm. and the circumference of its base is 16π cm.
, then its lateral area = cm²

- (a) 144π (b) 64π (c) 60π (d) 80π

(11) In the opposite figure :

The magnitude of four coplanar forces are $1, 2, 4\sqrt{3}, 3\sqrt{3}$ newton
act at point O in the direction of $\overrightarrow{OX}, \overrightarrow{OA}, \overrightarrow{OB}$ and \overrightarrow{Oy}



, $m \angle (AOC) = 60^\circ$, $m \angle (BOD) = 30^\circ$, then magnitude and the
direction of the resultant of the forces is

- (a) $(4, 180^\circ)$ (b) $(4, 0^\circ)$ (c) $(3, 0^\circ)$ (d) $(5, 90^\circ)$

(12) If a body is kept in equilibrium under action of several forces , then the least number of
forces could cause equilibrium equals

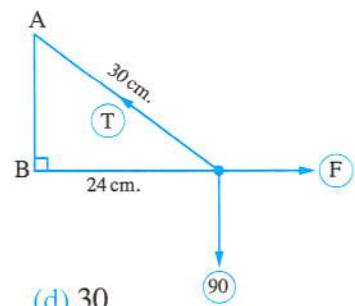
- (a) 1 (b) 2 (c) 3 (d) 4

(13) If the equation : $2x^2 + a y^2 + b xy - 5 = 0$ represents a circle
, then its area = square unit.

- (a) 5π (b) $\sqrt{5}\pi$ (c) $\frac{5}{2}\pi$ (d) $5\sqrt{2}\pi$

(14) In the opposite figure :

A body of weight 90 gm.wt. is attached to the end
of a string of 30 cm. long. The body is pulled by
horizontal force. It comes to equilibrium when it is 24 cm.
apart from the wall \overline{AB} , then $T - F =$ gm.wt.



- (a) 150 (b) 120 (c) 50 (d) 30

(15) Two forces of magnitudes 5 , 3 newton and the measure of the angle enclosed between
them is 60° , then the magnitude of their resultant R equals

- (a) 2 (b) 5 (c) 7 (d) 8

(16) If the circle whose equation : $x^2 + y^2 - 6x + 8y + c = 0$ touches y-axis
, then c =

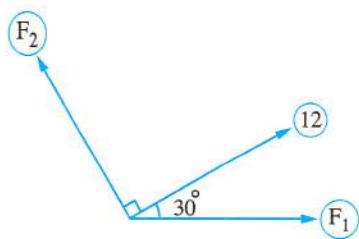
- (a) -9 (b) 9 (c) 16 (d) -16

(17) The force of magnitude 12 newton is resolved into

two components \vec{F}_1 , \vec{F}_2 make angles of measures 30° , 90° with it, then $F_2 = \dots$ newton.

- (a) 10
(c) $6\sqrt{3}$

- (b) $10\sqrt{3}$
(d) $4\sqrt{3}$



(18) The radius length of the base of a right circular cone = 5 cm. and its total surface area = 90π cm², then its volume = cm³

- (a) 105π (b) 95π (c) 100π (d) 120π

(19) If $\vec{F}_1 = (2, -2)$, $\vec{F}_2 = (4, -8)$ and their resultant $\vec{R} = (2a, -3b)$, then $a + b = \dots$

- (a) 3 (b) $\frac{10}{3}$ (c) $6\frac{1}{3}$ (d) 12

(20) The general form of the equation of a circle its centre is (5, -4) and touches X-axis is

- (a) $x^2 + y^2 - 10x + 8y + 25 = 0$ (b) $x^2 + y^2 - 5x + 4y = 0$
(c) $x^2 + y^2 - 10x + 8y = 25$ (d) $x^2 + y^2 + 10x - 8y + 25 = 0$

Second Essay questions

Answer the following questions :

1 A regular quadrilateral pyramid the length of its base is 20 cm., and its height is $10\sqrt{3}$ cm.

Find : Its lateral surface area

2 A body of weight 20 kg.wt. is placed on a smooth plane inclined to the horizontal with an angle of measure θ where $\cos \theta = \frac{4}{5}$ the body of kept in equilibrium by a horizontal force of magnitude F. **Find :** F and the reaction of the plane.

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El-Beheira Governorate



Maths Inspection

First Multiple choice questions

Choose the correct answer from the given ones :

(1) If A, B and C are three points determine a plane, then

- (a) $AB = BC = AC$ (b) $AB + BC = AC$
(c) $AB + BC > AC$ (d) $AB + BC < AC$

(2) A triangular regular faces pyramid , its edge length 10 cm.

, then its total area = cm²

(a) 40

(b) 100

(c) $100\sqrt{3}$

(d) $25\sqrt{3}$

(3) A regular quadrilateral pyramid , the area of its base = 100 cm^2 , and its height 12 cm.

, then its lateral area equal cm²

(a) 260

(b) 520

(c) 130

(d) 360

(4) A regular quadrilateral pyramid whose total area = 70 cm^2 , and its lateral area = 45 cm^2

, then its height = cm.

(a) 2.5

(b) 5

(c) $\sqrt{14}$

(d) 4.5

(5) The volume of a right circular cone is $9\pi \text{ cm}^3$, and the length of its base radius equal

the length of its height , then its base area = cm²

(a) 9π

(b) 3π

(c) 27π

(d) 12π

(6) The diameter length of the circle : $4x^2 + 4y^2 + 16x - 8y - 16 = 0$, is length unit.

(a) 3

(b) 6

(c) 12

(d) 24

(7) The point (2 , 3) lies the circle $x^2 + y^2 = 9$

(a) on

(b) inside

(c) outside

(d) in the center

(8) The magnitude of two forces F , 2 newton and the measure of their included angle = $\frac{2\pi}{3}$

, the magnitude of their resultant is F newton , then F = newton.

(a) 2

(b) 3

(c) 4

(d) $2\sqrt{2}$

(9) The magnitude of two forces 2 F , 5 F newton , and the measure of their included angle is θ and their resultant is 3 F , then $\theta = \dots \circ$

(a) zero

(b) 60

(c) 90

(d) 180

(10) A force of magnitude 40 newton acts vertically upwards is resolved into two components , one of them is horizontal of magnitude 20 newton , then the magnitude of the other = newton.

(a) 20

(b) $20\sqrt{3}$

(c) $20\sqrt{5}$

(d) $10\sqrt{3}$

(11) In the opposite figure :

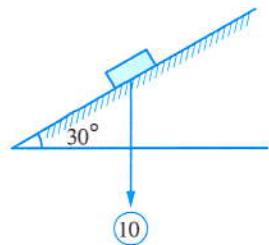
If a body of weight 10 newton is placed on a smooth plane inclined to the horizontal at an angle of measure 30° , then the components of the weight in direction of line of the greatest slope downward = newton.

(a) $5\sqrt{2}$

(b) $5\sqrt{3}$

(c) 5

(d) $10\sqrt{5}$



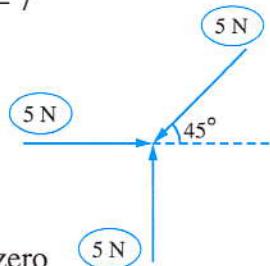
- (12) Three coplanar forces $\vec{F}_1 = 6\hat{i} + 7\hat{j}$, $\vec{F}_2 = a\hat{i} - 9\hat{j}$, $\vec{F}_3 = 5\hat{i} + b\hat{j}$ act at a particle and they are in equilibrium, then $a + 2b = \dots$

(a) -9 (b) 5 (c) 7 (d) -7

- (13) In the opposite figure :

Some forces meeting at a point , then the magnitude of the resultant of these forces = newton.

(a) $15\sqrt{2}$ (b) 5 (c) $5\sqrt{2} - 5$ (d) zero



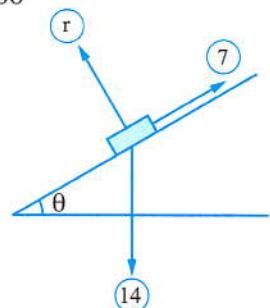
- (14) Three coplanar forces of magnitudes 60 , 88 and 60 gm.wt. , act at a point , the first is toward north , the second is in the direction 30° south of west and the third in the direction 30° south of east , then the magnitude of the resultant of these forces is gm.wt.

(a) 28 (b) 24 (c) 30 (d) 60

- (15) In the opposite figure :

If the body is in equilibrium when it is placed on an inclined smooth plane , then $m(\angle \theta) = \dots^\circ$

(a) 60 (b) 30 (c) 45 (d) 75



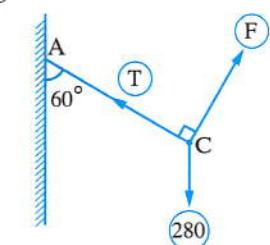
- (16) Three coplanar forces not on the same straight line meeting at a point are in equilibrium , the magnitude of two forces of them are 7 and 3 newton , then the magnitude of the third could be newton.

(a) 10 (b) 4 (c) 5 (d) 3

- (17) In the opposite figure :

A lamp of weight 280 gm.wt. is attached to the end of a string. It is in equilibrium under the effect of a force perpendicular to the string when it is inclined to the vertical by an angle of measure 60° , then $\frac{F}{T} = \dots$

(a) 2 (b) $\frac{1}{2}$ (c) $\frac{1}{\sqrt{3}}$ (d) $\sqrt{3}$



- (18) A uniform rod of weight 20 newton which is movable around a hinge at one of its ends is pulled a side by a horizontal force of magnitude 10 newton acting on the other end , then the measure of the angle of inclination of the rod to the vertical when it is in equilibrium = $^\circ$

(a) 60 (b) 45 (c) 30 (d) 90

(19) A metallic sphere of weight 15 gm.wt. is put such that it touches two smooth planes , one of them is vertical and the other inclines to the vertical by an angle of measure 30° , then the reaction on the vertical plane = newton.

(a) $15\sqrt{3}$

(b) 30

(c) 15

(d) $30\sqrt{3}$

(20) In the opposite figure :

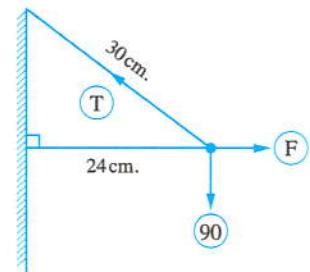
$T - F = \dots$ gm.wt.

(a) 150

(b) 30

(c) 50

(d) 120



Second Essay questions

Answer the following questions :

- A smooth sphere of weight 20 newton is on a smooth vertical wall and suspended by a light string from a point on its surface. The other end of the string is attached to a point on the wall above the point of contact between the wall and the sphere. If the length of the string equal the diameter of the sphere. Find the pressure on the wall and the tension in the string in case of equilibrium.
- ABC is an equilateral triangle , its side length 6 cm. , if the triangle is rotated a complete rotation around BC. Find the volume of the solid which formed from the rotation in terms of π

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Beni-Suef Governorate



Maths Inspection

First Multiple choice questions

Choose the correct answer from the given ones :

- If the magnitude of the resultant of two forces act at a point is maximum value , then the measure of the angle between their line of actions equals
- (a) 0° (b) 60° (c) 120° (d) 180°
- Two forces act at a point the magnitude of the two forces are 6 , 3 newton and their resultant is perpendicular to one of them , then the magnitude of their resultant = newton.
- (a) 3 (b) $3\sqrt{3}$ (c) 6 (d) $6\sqrt{3}$

(3) Two forces of magnitudes 8 and F gm.wt. the measure of the angle between them is $\theta \in]0, \pi[$, their resultant bisects the included angle between them , then $F = \dots$ gm.wt.

(a) 4

(b) $2\sqrt{2}$

(c) 8

(d) 16

(4) Two forces of magnitudes 4 and 6 newton act at a point , the measure of the angle between them is 90° , then the tangent of the angle between the resultant and the first force equals

(a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $2\sqrt{13}$ (d) $\frac{\sqrt{6}}{2}$

(5) The magnitude of a force is 6 newton and acts towards the North. It is resolved into two perpendicular components , then its component in direction of Eastern North is of magnitude

(a) zero

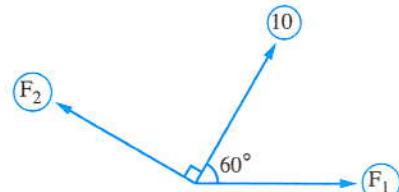
(b) 6

(c) $3\sqrt{2}$ (d) $2\sqrt{3}$

(6) In the opposite figure :

If the force of magnitude 10 newton is resolved

into two components \vec{F}_1 and \vec{F}_2 inclined to the force by two angles of measures 60° and 90° respectively , then $F_2 = \dots$ newton.

(a) $5\sqrt{3}$

(b) 10

(c) $10\sqrt{3}$

(d) 20

(7) If a body of weight 10 newton is placed on a smooth plane inclind to the horizontal at an angle of measure 30° , then the component of the weight in direction of line of the greatest slope downward =

(a) $5\sqrt{2}$

(b) 5

(c) $5\sqrt{3}$ (d) $10\sqrt{3}$

(8) If $\vec{F}_1 = \vec{i} - \vec{j}$, $\vec{F}_2 = 2\vec{i} - 4\vec{j}$, their resultant $\vec{R} = 2a\vec{i} - 3b\vec{j}$, then $a + b = \dots$

(a) 3

(b) $3\frac{1}{3}$ (c) $3\frac{1}{6}$

(d) 12

(9) If $\vec{F}_1 = 5\vec{i}$, $\vec{F}_2 = 7\vec{i} - 5\vec{j}$, \vec{R} is their resultant , then $\|\vec{R}\| = \dots$ force unit.

(a) 13

(b) $\sqrt{5} + \sqrt{74}$

(c) 49

(d) $\sqrt{12} - \sqrt{5}$

(10) If \vec{F} is in equilibrium with two forces of magnitudes 5 and 3 newton and the measure of the angle between them is 60° , then $F = \dots$ newton.

(a) $\sqrt{19}$ (b) $\sqrt{34}$

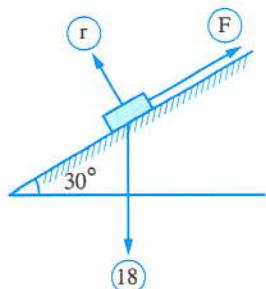
(c) 7

(d) 15

(11) In the opposite figure :

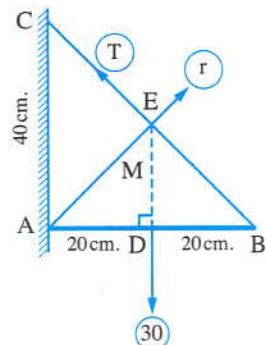
A body of weight 18 newton is placed on a smooth plane inclined to the horizontal by an angle of measure 30° , it is kept in equilibrium by a force of magnitude F newton in the direction of the plane upward, then $F + r = \dots$ newton.

- (a) $6\sqrt{3}$ (b) $9\sqrt{3}$
 (c) $18\sqrt{3}$ (d) $9 + 9\sqrt{3}$



(12) In the opposite figure :

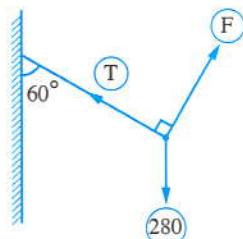
AB is a uniform rod with length 40 cm. and weight 30 newton is connected to a hinge at A if the rod kept in equilibrium horizontally by a light string connected to the rod at B and C where C is located on the wall just above A , $AC = 40 \text{ cm}$. , then the reaction of the hinge $r = \dots$ newton.



(13) In the opposite figure :

A lamp of weight 280 gm.wt. is attached to the end of a string. It is in equilibrium under the effect of a force perpendicular to the string when it is inclined to the vertical by an angle of measure 60° , then $\frac{F}{T} = \dots$

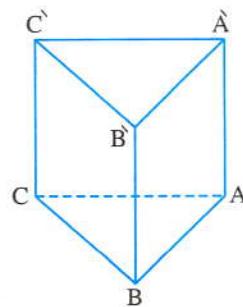
- (a) $\frac{1}{\sqrt{3}}$ (b) $\frac{1}{2}$ (c) $\sqrt{3}$



(14) In the opposite figure :

The plane ABC \cap the plane A'B'C' =

- (a) \overleftrightarrow{BB}
 (b) \emptyset
 (c) \overleftrightarrow{AB}
 (d) \overleftrightarrow{AA}



(15) Number of planes that are passing through three non-collinear points is

- (16) A regular quadrilateral pyramid whose volume is 480 cm^3 and its base length is 12 cm.
, then the length of its height = cm.
- (a) 10 (b) 15 (c) 20 (d) 30
- (17) A triangular regular faces pyramid , its edge length 10 cm. , then its total area equal cm^2
- (a) 40 (b) 100 (c) $100\sqrt{3}$ (d) $25\sqrt{3}$
- (18) The center of the circle whose equation : $x^2 + y^2 - 6x + 8y = 0$ is the point
- (a) (3, -4) (b) (4, -3) (c) (-3, 4) (d) (-4, 3)
- (19) Which of the following points does lie on the circle whose equation : $(x-2)^2 + y^2 = 13$?
- (a) (2, 3) (b) (3, -2) (c) (2, 5) (d) (4, 3)
- (20) The equation of the circle whose center (4, 3) and touches X-axis is
- (a) $(x-3)^2 + (y-4)^2 = 16$ (b) $(x-4)^2 + (y-3)^2 = 9$
 (c) $(x+3)^2 + (y+4)^2 = 9$ (d) $(x+3)^2 + (y-4)^2 = 16$

Second Essay questions

Answer the following questions :

- 1 ABCDEF is a regular hexagon , the forces of magnitudes $6, 2\sqrt{3}, 6, 2\sqrt{3}$ newton act on $\overrightarrow{AB}, \overrightarrow{AC}, \overrightarrow{AD}$ and \overrightarrow{AE} respectively. Find the magnitude of the resultant of these forces.
-
- 2 Find to the nearest tenth , the total area of the right circular cone in which the diameter length of its base is 10 cm. and its height is 12 cm.

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El-Menia Governorate



Maths Inspection

First Multiple choice questions

Choose the correct answer from the given ones :

- (1) The case that doesn't determine a plane is
- (a) two intersecting straight lines. (b) two different parallel straight lines.
 (c) three points not collinear. (d) straight line and point on it.
- (2) Two forces of magnitudes $8, F$ newton , the angle between them $\theta \in]0, \pi[$
 their resultant bisects the angle between them , then $F = \dots$ newton.
- (a) 4 (b) 8 (c) 16 (d) $2\sqrt{3}$

(3) If the circle whose equation : $X^2 + y^2 - 6x + 8y + c = 0$ touches X -axis , then $c = \dots$

- (a) 6 (b) -6 (c) 9 (d) -9

(4) If θ is the measure of the angle between two forces of magnitudes 2 N , 6 N and R is the resultant between them by newton where $4 \leq R < 8$, then angle between them $\in \dots$

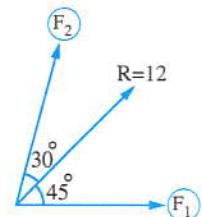
- (a) $[0, \pi]$ (b) $]0, \pi]$ (c) $[\frac{\pi}{2}, \pi]$ (d) $]0, \pi[$

(5) In the opposite figure :

$$R = 12 \text{ newton}$$

, then $F_1 = \dots$ newton.

- (a) $12 \cos 45^\circ$ (b) $12 \sin 45^\circ$
 (c) $6 \csc 45^\circ$ (d) $6 \csc 75^\circ$



(6) Two forces of magnitudes 12 N , 15 N acting at a point and angle between them θ° where $\cos \theta^\circ = \frac{-4}{5}$, then the angle between resultant and first force =

- (a) zero (b) 30° (c) 60° (d) 90°

(7) If $\vec{F}_1, \vec{F}_2, \vec{F}_3$ are three forces intersect at a point and equilibrium where $\vec{F}_1 = (2, -5)$, $\vec{F}_2 = (-3, 2)$, then $\vec{F}_3 = \dots$

- (a) $(-1, -3)$ (b) $(1, 3)$ (c) $(-6, -10)$ (d) $(6, 10)$

(8) If $\vec{F}_1 = 3\hat{i} - 2\hat{j}$, $\vec{F}_2 = a\hat{i} - \hat{j}$, $\vec{F}_3 = 4\hat{i} - b\hat{j}$, and the resultant $\vec{R} = 6\hat{i} - 4\hat{j}$, then (a , b) =

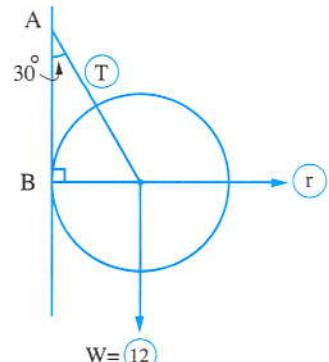
- (a) $(1, -1)$ (b) $(-1, 1)$ (c) $(-1, -1)$ (d) $(1, 1)$

(9) In the opposite figure :

If the sphere is in equilibrium

, then $(T, r) = \dots$ newton.

- (a) $(4, 8)$ (b) $(12, 8)$
 (c) $(4\sqrt{3}, 8\sqrt{3})$ (d) $(8\sqrt{3}, 4\sqrt{3})$



(10) The volume of triangular regular faces pyramid its edge length 6 cm. = cm³

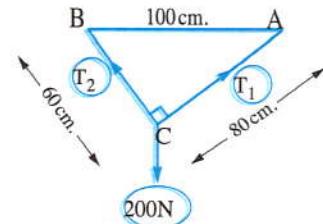
- (a) $18\sqrt{2}$ (b) $54\sqrt{2}$ (c) $27\sqrt{3}$ (d) $36\sqrt{3}$

(11) A right circular cone the length of its drawer 25 cm. and its lateral area 550 cm^2 , then its volume = cm³. ($\pi = \frac{22}{7}$)

- (a) 1223 (b) 1232 (c) 1322 (d) 3122

(12) In the opposite figure :

A body its weight 200 N is hanged by two strings , then the magnitude of the tension in the two strings = N



- (a) 120 , 160 (b) 180 , 12 (c) 150 , 160 (d) 100 , 130

(13) If the length of the radius of right circular cone 3 cm. and its height 4 cm.

, then its total area = cm²

- (a) 9π (b) 10π (c) 21π (d) 24π

(14) Three coplanar forces of magnitude 5 , 6 , 7 newton act at a particle if the forces are in equilibrium , then the cosine of the angle between the second and the third force =

- (a) $\frac{7}{5}$ (b) $-\frac{5}{7}$ (c) $\frac{15}{17}$ (d) $\frac{1}{2}$

(15) The point that lies on the circle : $(x + 2)^2 + y^2 = 13$ from the following is

- (a) (-2 , 0) (b) (0 , -2) (c) (1 , 2) (d) (-1 , -2)

(16) Any four points don't lie in one plane determine

- (a) one plane. (b) two planes. (c) three planes. (d) four planes.

(17) Three coplanar forces not on the same straight line meeting at a point are in Equilibrium the magnitudes of them are 4 , 8 , F , then F could be N

- (a) 3 (b) 4 (c) 8 (d) 13

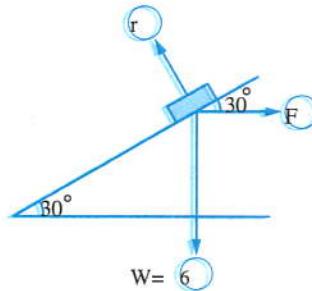
(18) A body of weight 6 newton is placed on smooth plane inclined to the horizontal at an angle 30° it kept in equilibrium by horizontal force of magnitude F , then F = newton.

- (a) $2\sqrt{3}$ (b) $3\sqrt{3}$ (c) $4\sqrt{3}$ (d) $6\sqrt{3}$

(19) In the opposite figure :

r =

- (a) $2\sqrt{3}$ (b) $3\sqrt{3}$ (c) $4\sqrt{3}$ (d) $6\sqrt{3}$



(20) In the previous figure :

The component of the weight in the direction of the greatest slope to the bottom = N

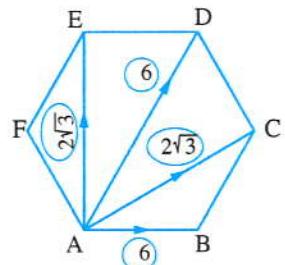
- (a) 3 (b) $3\sqrt{3}$ (c) $4\sqrt{3}$ (d) $6\sqrt{3}$

Second**Essay questions****Answer the following questions :**

- 1** Regular quadrilateral pyramid , the length of its base side is 10 cm. , and area of one of its lateral faces is 60 cm^2 . **Find :** Its total area.

- 2 In the opposite figure :**

ABCDEF is a regular hexagon , forces of magnitudes 6 , $2\sqrt{3}$, 6 , $2\sqrt{3}$ newton act along \overrightarrow{AB} , \overrightarrow{AC} , \overrightarrow{AD} and \overrightarrow{AE} respectively
Find their resultant.

**14****Assiut Governorate****Maths Inspection****First****Multiple choice questions****Choose the correct answer from the given ones :**

- (1)** Two forces of equal magnitudes enclosing between them an angle of measure $\frac{\pi}{2}$ if the magnitude of their resultant is 8 newton , then the value of each force is newton.
 (a) $2\sqrt{2}$ (b) 4 (c) $4\sqrt{2}$ (d) 8
- (2)** A force of magnitude $10\sqrt{2}$ gm.wt. acts in the Eastern South direction , is resolved into two perpendicular components , then the magnitude of the component in the south direction = gm.wt.
 (a) 5 (b) 10 (c) $10\sqrt{2}$ (d) $5\sqrt{2}$
- (3)** If $\vec{F}_1 = 4\hat{i}$, $\vec{F}_2 = 8\hat{i} - \hat{j}$, $\vec{F}_3 = 4\hat{i} - 5\hat{j}$, then $\|\vec{R}\| =$ force unit.
 (a) 12 (b) 5 (c) 13 (d) $2\sqrt{73}$
- (4)** Two forces act at a point the magnitude of the two forces $8\sqrt{3}$, 8 newton and the measure of the included angle between them 150° , then the magnitude of their resultant = newton.
 (a) 64 (b) 32 (c) 16 (d) 8
- (5)** Two forces of magnitudes F , $2F$ newton act at a point if their resultant is perpendicular to one of them , then $R =$
 (a) $\sqrt{5}F$ (b) $\sqrt{3}F$ (c) $3F$ (d) F

(6) The magnitude of a force is 8 newton and acts in East direction. It is resolved into two components , the angle between the two components is 120° , then its component in south direction = newton.

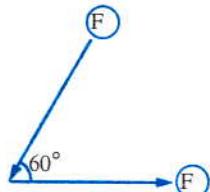
- (a) 16 (b) 8 (c) $8\sqrt{3}$ (d) $\frac{8\sqrt{3}}{3}$

(7) The resultant of two forces of magnitudes 6 newton and 8 newton could be newton.

- (a) 20 (b) 15 (c) 12 (d) 1

(8) The magnitude of the resultant of the two forces shown in the opposite figure is

- (a) $\frac{1}{2} F$ (b) F
 (c) $\sqrt{3} F$ (d) $\sqrt{5} F$



(9) The magnitude of the resultant of two forces act at a point is maximum value , then the measure of the angle between the two forces equal

- (a) 180° (b) 120° (c) zero (d) 60°

(10) Three equal forces in magnitude meeting at a point and they are in equilibrium , then the measure of the angle between each two forces is

- (a) 60° (b) 90° (c) 120° (d) 150°

(11) The least number of coplanar unequal in magnitude forces could be in equilibrium is

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

(12) The weight of a body is 20 kg.wt. it is placed on a smooth inclined plane makes an angle of measure θ to the horizontal , where $\sin \theta = \frac{3}{5}$ and it prevent from sliding by a horizontal force F , then F = kg.wt.

- (a) 30 (b) 15 (c) 10 (d) $5\sqrt{3}$

(13) Number of planes that are passing through three non-collinear points is

- (a) 1 (b) 2 (c) 3 (d) an infinite number.

(14) A regular quadrilateral pyramid whose volume is 480 cm^3 and its base length is 12 cm. , then the length of its height = cm.

- (a) 10 (b) 20 (c) 30 (d) 15

(15) The right circular cone is generated by folding a paper in the shape of

- (a) an equilateral triangle. (b) a circular segment.
 (c) a right-angled triangle. (d) a circular sector.

- (16) The radius length of the base of a right circular cone where its total area $616\pi \text{ cm}^2$ and the length of its drawer is 30 cm. is cm.
(a) 44 (b) 14 (c) 30 (d) 34
- (17) The radius length of the circle whose equation : $x^2 + y^2 - 4x + 2y - 4 = 0$ is length unit.
(a) 2 (b) 3 (c) 4 (d) 9
- (18) The circumference of the circle whose equation : $(x - 3)^2 + (y + 2)^2 = 25$ equal length unit.
(a) 2π (b) 3π (c) 10π (d) 25π
- (19) The measure of the smallest rotation angle of an isosceles triangle around its axis of symmetry to form a right circular cone is
(a) 90° (b) 180° (c) 270° (d) 60°
- (20) The point which lies on the circle : $(x - 2)^2 + y^2 = 13$ is
(a) (2, 3) (b) (3, -2) (c) (2, 0) (d) (4, 3)

Second Essay questions

Answer the following questions :

- 1 Two forces of magnitude 2 and F newton , the angle between them is of measure 120° find F if the resultant is perpendicular to the second force.
- 2 Four coplanar forces act on a particle the first of magnitude 4 newton act in the East direction , the second of magnitude 2 newton acts in direction 60° North of the East , the third of magnitude 5 newton acts in the direction 60° North of the West and the fourth of magnitude $3\sqrt{3}$ newton acts in direction 60° West of the South find the magnitude of the resultant and its direction.

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Qena Governorate



Maths Inspection

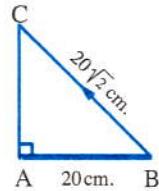
First Multiple choice questions

Choose the correct answer from the given ones :

- (1) The circle which equation : $x^2 + y^2 = 25$ its center
(a) (0, 0) (b) (5, 5) (c) (0, 1) (d) (1, 0)

- (2) A regular quadrilateral pyramid its height 4 cm. , and its slant height 5 cm. , then length side of its base cm.
- (a) 5 (b) 3 (c) 4 (d) 6
- (3) Two forces F , 16 newton act on a particle if their resultant 26 newton and angle between their directions 120° , then $F = \dots$ newton.
- (a) 30 (b) 41 (c) 16 (d) 26
- (4) If \vec{F}_1 , \vec{F}_2 , \vec{F}_3 are three forces meeting at a point they are in equilibrium , then magnitude of resultant of the two forces \vec{F}_1 , \vec{F}_2 is the magnitude of
- (a) \vec{F}_1 (b) $\vec{F}_1 + \vec{F}_2$ (c) 0 (d) \vec{F}_3
- (5) Two straight lines L_1 , L_2 are parallel if
- (a) $L_1 \cap L_2 = \emptyset$
 (b) L_1 , L_2 lie in the same plane.
 (c) $L_1 \cap L_2 = \emptyset$ and L_1 , L_2 lie in the same plane.
 (d) $L_1 \cap L_2 = \emptyset$ and L_1 , L_2 don't lie in the same plane.
- (6) Three forces of magnitudes 60 , 120 , K newton meeting at a point they are in equilibrium if measure of the angle between first and second forces 120° and between second and third 150° , then $K = \dots$ newton.
- (a) 120 (b) $60\sqrt{3}$ (c) 150 (d) 60
- (7) Right circular cone , radius length of its base 9 cm. , its height 14 cm. , then volume = cm^3 ($\pi = \frac{22}{7}$)
- (a) 3564 (b) 396 (c) 1188 (d) 1782
- (8) Regular quadrilateral pyramid length side of its base 10 cm. , its height 12 cm. , then its volume cm^3
- (a) 300 (b) 400 (c) 600 (d) 120
- (9) Two equal forces , magnitude of each 6 gm.wt. and magnitude of their resultant 6 gm.wt. , then measure of the angle between directions of the two forces is
- (a) 60° (b) 120° (c) 30° (d) 45°
- (10) The weight of a body is 10 newton it is placed on smooth inclined plane make an angle 30° to the horizontal , then the component of the weight in perpendicular direction to the plane = newton
- (a) 5 (b) 10 (c) $5\sqrt{3}$ (d) 2

- (11)** Ratio between edge length of triangular pyramid of regular faces : its height =
 (a) $\sqrt{2} : \sqrt{3}$ (b) $\sqrt{3} : \sqrt{2}$ (c) $\sqrt{3} : 2$ (d) $\sqrt{3} : 3$
- (12)** Force of magnitude 6 newton act in direction east it is resolved into two perpendicular components so its component in direction of north newton.
 (a) 0 (b) $3\sqrt{2}$ (c) 6 (d) 3
- (13)** The minimum value of the resultant of two forces 10 , 7 newton meeting at point = newton.
 (a) 17 (b) 10 (c) 7 (d) 3
- (14)** A body of weight 60 newton is placed on smooth plane inclined with the horizontal at angle of measure 30° and tied up by string in direction of line of greatest slope of the plane upward , then value tension of string =
 (a) 30 (b) $30\sqrt{3}$ (c) 60 (d) $60\sqrt{3}$
- (15)** \overline{AB} is uniform rod with length 20 cm. and weight 30 newton connected to a hinge on the vertical wall at A if the rod kept in equilibrium horizontally by light string connected to rod at B of length $20\sqrt{2}$ cm. , fixed at point C on the wall just above A , then the reaction of the hinge
 (a) In direction of \overrightarrow{AB} (b) bisect \overrightarrow{BC}
 (c) Its magnitude 15 newton. (d) Its line of action far from wall by 10 cm.
- (16)** If \vec{F} is in equilibrium with two perpendicular forces of magnitudes 3 , 4 newton , then $F =$ newton.
 (a) 4 (b) 5 (c) 6 (d) 25
- (17)** If $\vec{F}_1 = 4\hat{i} + 3\hat{j}$, $\vec{F}_2 = -\hat{i} + 5\hat{j}$, $\vec{F}_3 = 2\hat{i} - 20\hat{j}$ are three forces , then magnitude of resultant = unit force.
 (a) 13 (b) 0 (c) 17 (d) 7
- (18)** Radius length of the base of right circular cone 15 cm. , and length of its drawer 25 cm. , then lateral surface area = cm^2 .
 (a) 375π (b) 15π (c) 25π (d) 187.5π
- (19)** The forces of magnitudes $7\sqrt{3}$, 7 , K newton act on particle in the directions East , North , 30° South of West respectively if magnitude of the resultant 8 newton in direction 30° North of East , then K = newton.
 (a) $7\sqrt{3}$ (b) 6 (c) 7 (d) 12



(20) A weight of 100 gm.wt. is suspended by two strings of length 30 cm., 40 cm., the two other ends are fixed at two points on horizontal line such that the string parts are perpendicular to each other then magnitude of the tension in first string gm.wt.

- (a) 80 (b) 100 (c) $60\sqrt{3}$ (d) 60

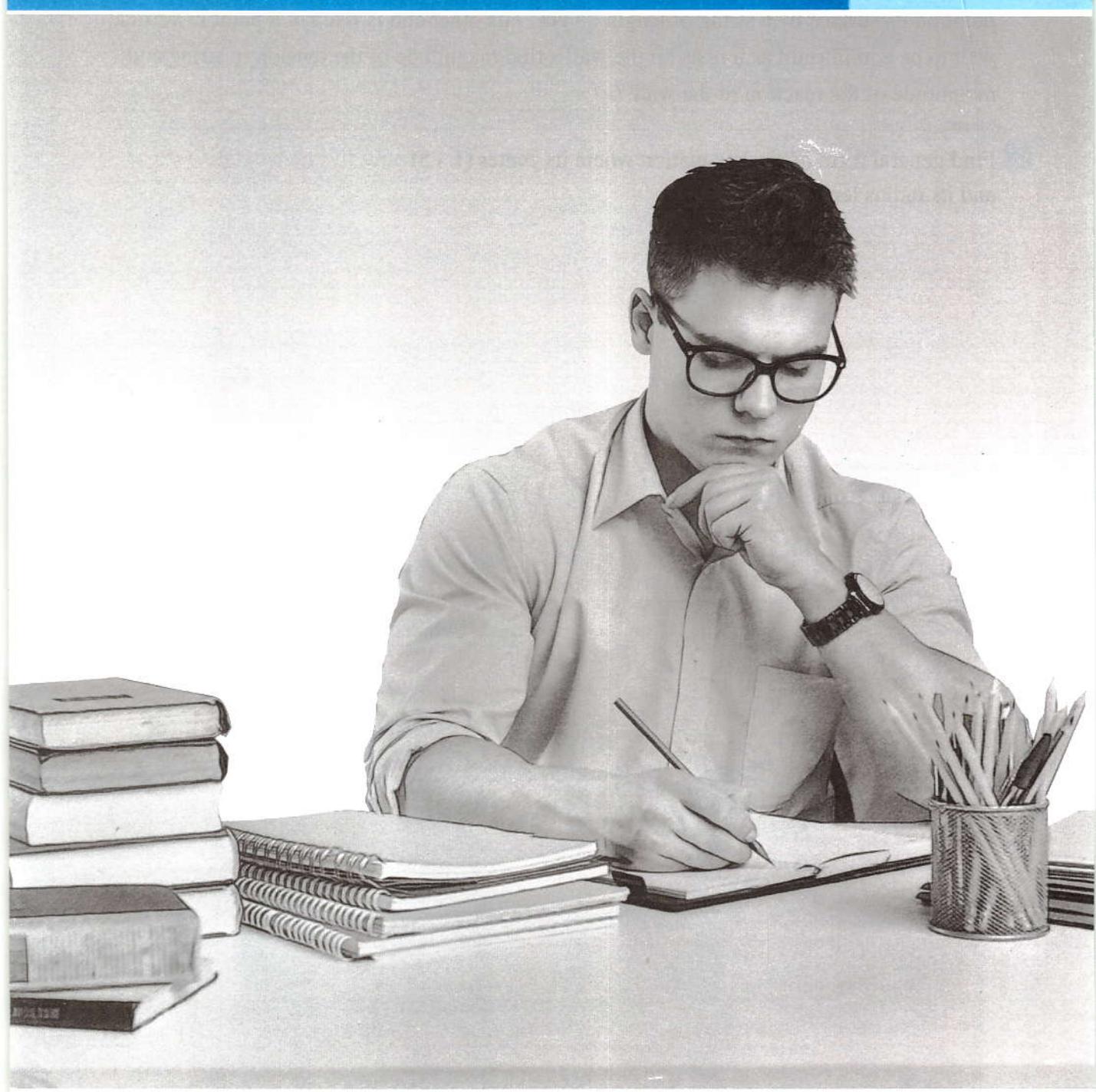
Second Essay questions

Answer the following questions :

- 1** A metallic sphere of weight 1.5 kg.wt. and of radius length 25 cm. , is suspended at a point on its surface by a string of length 25 cm. , its other end is fixed at a point in vertical wall to be equilibrium as it rests on the wall , find magnitude of the tension in string and magnitude of the reaction of the wall ?

2 Find general form of circle equation where its center (1 , 5) and its radius length 6 unit length.

Answers



Answers of accumulative quizzes on Statics

Accumulative quiz 1

- 1** (1) (d) (2) (b) (3) (a) (4) (c)

2

$F = 8$ newton, the measure of the inclination angle of the resultant on $\vec{F} = 30^\circ$

3

$F = 8$ newton

Accumulative quiz 2

- 1** (1) (a) (2) (c) (3) (c) (4) (d)

2

$F = 4\sqrt{2}$ newton, $R = 4$ newton.

3

$50, 50\sqrt{3}$ newton.

Accumulative quiz 3

- 1** (1) (b) (2) (c) (3) (c) (4) (c)

2

$R \approx 15.16$ kg.wt., $\theta \approx 99^\circ 30'$

3

$22, 10$ kg.wt., $R = 2\sqrt[2]{201}$ kg.wt.

Accumulative quiz 4

- 1** (1) (c) (2) (d) (3) (b) (4) (a)

2

$100\sqrt{3}$ gm.wt., $100\sqrt[3]{3}$ gm.wt.

3

$a = -1, b = 1$

Accumulative quiz 5

- 1** 135° , prove by yourself.

2

$R = 4\sqrt{2}$ newton, in direction of \vec{AC}

3

$T = \frac{20\sqrt{3}}{3}$ gm.wt, $r = \frac{10\sqrt{3}}{3}$ gm.wt.

4

$9\sqrt{7}$ newton, $\sqrt{7}$ newton.

Answers of accumulative quizzes on Geometry and Measurement

Accumulative quiz 1

- 1** (1) (d) (2) (a) (3) (d) (4) (a) (5) (d)

2

(1) The two planes ABCD, $\hat{A}\hat{B}\hat{C}\hat{D}$
(there are other solutions)

(2) The two planes ABCD, $A\hat{B}\hat{B}\hat{A}$
(there are other solutions)

(3) The two straight lines $\overrightarrow{AB}, \overrightarrow{BC}$
(there are other solutions)

(4) \overrightarrow{AB} , the plane $\hat{A}\hat{B}\hat{C}\hat{D}$
(there are other solutions)

(5) \overrightarrow{AB}

Accumulative quiz 2

- 1** (1) (b) (2) (c) (3) (b) (4) (d)

2

(1) Lateral area = 800 cm^2

(2) The volume = $\frac{4000\sqrt{3}}{3} \text{ cm}^3$

3

Total area = $576\sqrt{3} \text{ cm}^2$

Accumulative quiz 3

- 1** (1) (a) (2) (a) (3) (d) (4) (d)

2

Lateral height = 15 cm. ,
lateral area = 540 cm^2

3

14 cm.

Accumulative quiz 4

- 1** (1) (a) (2) (c) (3) (a) (4) (d)

2

$x^2 + y^2 + 4x - 10y - 5 = 0$

3

(1) Total area = $96\pi \text{ cm}^2$

(2) Volume = $96\pi \text{ cm}^3$

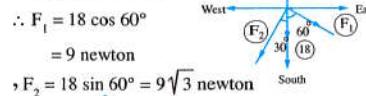
Answers of October tests

Answers of Test 1

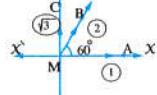
- 1**
 (1) b (2) c (3) b
 (4) d (5) a (6) d

2

(1) ∵ The two components are perpendicular



(2)



Consider \overrightarrow{OX} is the direction of the first force.

$$X = 1 \cos 0^\circ + 2 \cos 60^\circ + \sqrt{3} \cos 90^\circ \\ = 1 \times 1 + 2 \times \frac{1}{2} + \sqrt{3} \times 0 = 2$$

$$Y = 1 \sin 0^\circ + 2 \sin 60^\circ + \sqrt{3} \sin 90^\circ$$

$$= 1 \times 0 + 2 \times \frac{\sqrt{3}}{2} + \sqrt{3} \times 1 = 2\sqrt{3}$$

$$\therefore \vec{R} = 2\hat{i} + 2\sqrt{3}\hat{j}, R = \sqrt{(2)^2 + (2\sqrt{3})^2} \\ = 4 \text{ newton}$$

$$\tan \theta = \frac{2\sqrt{3}}{2} = \sqrt{3}$$

$$\therefore X > 0, Y > 0 \quad \therefore \theta = 60^\circ$$

∴ The magnitude of $\vec{R} = 4$ newton and its direction is \overline{MB}

Answers of Test 2

- 1**
 (1) b (2) c (3) d
 (4) b (5) d (6) d

2

(1) From the figure

$$F_1 = \frac{40 \sin (90^\circ - \theta)}{\sin (180^\circ - \theta)} \\ = \frac{40 \cos \theta}{\sin \theta} = \frac{40 \times 0.6}{0.8} = 30 \text{ N.}$$

$$, F_2 = \frac{40 \sin 90^\circ}{\sin (180^\circ - \theta)} = \frac{40 \times 1}{\sin \theta} = \frac{40}{0.8} = 50 \text{ N.}$$

(2) $X = 10 \cos 0^\circ + 20 \cos 120^\circ$

$$+ 30 \cos 240^\circ = -15$$

$$Y = 10 \sin 0^\circ + 20 \sin 120^\circ \\ + 30 \sin 240^\circ = -5\sqrt{3}$$

$$\therefore \vec{R} = -15\hat{i} - 5\sqrt{3}\hat{j}$$

$$\therefore R = \sqrt{225 + 75} \\ = 10\sqrt{3} \text{ N.}$$

$$\tan \theta = \frac{y}{x} = \frac{-5\sqrt{3}}{-15} = \frac{1}{\sqrt{3}}$$

$$\therefore x < 0, y < 0$$

$$\therefore \theta = 180^\circ + 30^\circ = 210^\circ$$

i.e. In direction 30° South of West.

Answers of November tests

Answers of Test 1

- 1**
 (1) c (2) a (3) a
 (4) a (5) d (6) d

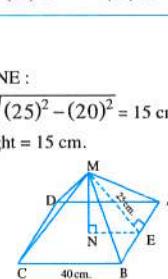
2

(1) (1) In $\triangle MNE$:

$$MN = \sqrt{(25)^2 - (20)^2} = 15 \text{ cm.}$$

i.e. height = 15 cm.

(2)

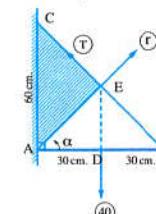


$$\text{The lateral area} = \frac{1}{2} \times \text{base perimeter} \times \text{slant height} \\ = \frac{1}{2} \times (4 \times 40) \times 25 = 2000 \text{ cm}^2$$

$$(3) \text{ The total area} = 2000 + (40)^2 = 3600 \text{ cm}^2$$

$$(4) \text{ The volume} = \frac{1}{3} \times (40)^2 \times 15 = 8000 \text{ cm}^3$$

(2)



∴ The set of forces are in equilibrium.

∴ The line of action of \vec{r} passes through the point E

∴ D is the midpoint of \overline{AB} , $\overline{DE} \parallel \overline{AC}$

∴ E is the midpoint of \overline{BC}

$$BC = 60\sqrt{2} \text{ cm. (Pythagoras theorem)}$$

$\triangle AEC$ is the triangle of forces where :

$$AE = \frac{1}{2} BC = 30\sqrt{2} \text{ cm.}$$

$$, EC = 30\sqrt{2} \text{ cm. } , AC = 60 \text{ cm.}$$

$$\therefore \frac{r}{30\sqrt{2}} = \frac{T}{30\sqrt{2}} = \frac{40}{60}$$

$$\therefore r = T = 20\sqrt{2} \text{ newton}$$

Answers of Test 2

Answers of Test 2

- 1**
 (1) b (2) b (3) b
 (4) a (5) c (6) a

2

(1) (1) The area of the base = πr^2

$$\therefore 36\pi = \pi r^2 \quad \therefore r = 6 \text{ cm.}$$

$$\text{, the lateral area} = \pi r L = \pi \times 6 \times 10 \\ = 60\pi \text{ cm}^2.$$

$$(2) \text{ The total area} = \pi r (L + r) = \pi \times 6 (10 + 6) \\ = 96\pi \text{ cm}^2.$$

$$(3) h = \sqrt{(10)^2 - (6)^2} = 8 \text{ cm.}$$

$$\therefore \text{Volume} = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi \times 6^2 \times 8 \\ = 96\pi \text{ cm}^3.$$

$$(2) \because (60)^2 + (80)^2 = (100)^2$$

∴ $\triangle ACB$ is right-angled at C

From lami's rule

$$\therefore \frac{200}{\sin 90^\circ} = \frac{T_1}{\sin \theta_1} = \frac{T_2}{\sin \theta_2}$$

$$\therefore \sin \theta_1 = \frac{BC}{AB} = \frac{80}{100} = \frac{4}{5}$$

$$\therefore \sin \theta_2 = \frac{AC}{AB} = \frac{60}{100} = \frac{3}{5}$$

$$\therefore \frac{200}{1} = \frac{T_1}{\frac{4}{5}} = \frac{T_2}{\frac{3}{5}}$$

$$\therefore T_1 = 200 \times \frac{4}{5} = 160 \text{ gm.wt.}$$

$$, T_2 = 200 \times \frac{3}{5} = 120 \text{ gm.wt.}$$

**Answers of school book
examination**

- 1 (1) (a) (2) (d) (3) (d) (4) (b)

2 (a) $5 + a - 14 = 10\sqrt{2} \cos 135^\circ = -10$ $\therefore a = -1$
 $, 3 + 6 + b = 10\sqrt{2} \sin 135^\circ = 10$ $\therefore b = 1$

(b) Let the angle between
the inclined plane and
the horizontal be θ

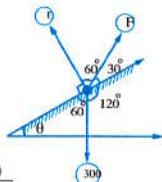
$$\therefore \tan \theta = \frac{1}{\sqrt{3}}$$

$$\therefore \theta = 30^\circ$$

$$\therefore \frac{F}{\sin 150^\circ} = \frac{r}{\sin 150^\circ} = \frac{300}{\sin 60^\circ}$$

$$\therefore \frac{F}{\frac{1}{2}} = \frac{1}{2} = \frac{\sqrt{3}}{2}$$

$$\therefore F = r = \frac{300 \times \frac{1}{2}}{\frac{\sqrt{3}}{2}} = 100\sqrt{3} \text{ gm.wt.}$$



3 (a) $(x - 2)^2 + (y + 1)^2 = 3^2$

$$\therefore x^2 + y^2 - 4x + 2y - 4 = 0$$

(b) $\triangle MAB$ is the triangle of forces

where $AM = 60 \text{ cm.}$

, $MB = 30 \text{ cm.}$

$$\therefore AB = \sqrt{(60)^2 - (30)^2} \\ = 30\sqrt{3}$$

Applying the triangle
of forces rule :

$$\frac{r}{30} = \frac{T}{60} = \frac{10}{30\sqrt{3}}$$

$$\therefore r = \frac{10\sqrt{3}}{3} \text{ gm.wt.}, T = \frac{20\sqrt{3}}{3} \text{ gm.wt.}$$

4

(a) Volume of the wax = volume of cube
 $= (30)^3 = 27000 \text{ cm}^3.$
 $, \because 8\% \text{ of wax had been lost during the melting and transferring}$
 $\therefore \text{The volume of the cone} = 92\% \times 27000 \\ = 24840 \text{ cm}^3.$
 $\therefore \text{volume of the cone} = \frac{1}{3}\pi r^2 h$
 $\therefore \frac{1}{3} \times \pi \times r^2 \times 45 = 24840$
 $\therefore r = 22.959 \text{ cm.}$

(b) $\because (AB)^2 = (BC)^2 + (AC)^2$
 $\therefore m(\angle ACB) = 90^\circ \therefore CD = \frac{1}{2} AB = 50 \text{ cm.}$
 $\therefore CD = DB \therefore m(\angle B) = \theta_1$
 $, \because CD = AD \therefore m(\angle A) = \theta_2$
 $\frac{T_1}{\sin(90^\circ + \theta_1)} = \frac{T_2}{\sin(90^\circ + \theta_2)}$
 $= \frac{150}{\sin 90^\circ}$
 $\therefore \frac{T_1}{\cos \theta_1} = \frac{T_2}{\cos \theta_2} = \frac{150}{1}$
 $\therefore \frac{T_1}{\frac{6}{10}} = \frac{T_2}{\frac{8}{10}} = 150$
 $\therefore T_1 = 90 \text{ gm.wt.}, T_2 = 120 \text{ gm.wt.}$

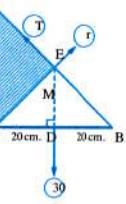
5

(a) $X = 8 \cos 0^\circ + 6\sqrt{3} \cos 30^\circ$
 $+ 5 \cos 60^\circ + 4\sqrt{3} \cos 90^\circ$
 $= 8 \times 1 + 6\sqrt{3} \times \frac{\sqrt{3}}{2}$
 $+ 5 \times \frac{1}{2} + 4\sqrt{3} \times 0$
 $= \frac{39}{2}$
 $, Y = 8 \sin 0^\circ + 6\sqrt{3} \sin 30^\circ + 5 \sin 60^\circ + 4\sqrt{3} \sin 90^\circ$
 $= 8 \times 0 + 6\sqrt{3} \times \frac{1}{2} + 5 \times \frac{\sqrt{3}}{2} + 4\sqrt{3} \times 1 = \frac{19\sqrt{3}}{2}$
 $\therefore \vec{R} = \frac{39}{2} \hat{i} + \frac{19\sqrt{3}}{2} \hat{j}$

$$\therefore R = \sqrt{\left(\frac{39}{2}\right)^2 + \left(\frac{19\sqrt{3}}{2}\right)^2} = \sqrt{651} \text{ newton}$$
 $, \tan \theta = \frac{19}{39}\sqrt{3} \quad \therefore \theta \approx 40^\circ \hat{\theta}$

(b) \because The set of forces are in equilibrium

$\therefore \vec{r}$ passes through the point E
 $, \because D$ is the midpoint of
 $\overline{AB}, \overline{DE} \parallel \overline{AC}$
 $\therefore E$ is the midpoint of \overline{CB}
 $, \because BC = \sqrt{(40)^2 + (40)^2}$
 $= 40\sqrt{2}$



$$\therefore CE = 20\sqrt{2} \text{ and } AE = 20\sqrt{2}$$
 $\therefore \triangle AEC$ is triangle of forces
 $\therefore \frac{r}{20\sqrt{2}} = \frac{T}{20\sqrt{2}} = \frac{30}{40}$
 $\therefore r = T = 15\sqrt{2} \text{ newton.}$

Answers of schools examinations

1 Cairo

First Multiple choice questions

- (1) (a) (2) (a) (3) (b) (4) (a)
 (5) (c) (6) (a) (7) (b) (8) (c)
 (9) (a) (10) (a) (11) (b) (12) (d)
 (13) (a) (14) (d) (15) (c) (16) (b)
 (17) (d) (18) (a) (19) (d) (20) (c)

Second Essay questions

1

Applying lami's rule

$$\begin{aligned} \frac{F}{\sin 150^\circ} &= \frac{r}{\sin 90^\circ} = \frac{12}{\sin 120^\circ} \\ \therefore \frac{1}{2} \cdot \frac{r}{1} &= \frac{12}{\frac{\sqrt{3}}{2}} \\ \therefore F &= \frac{12 \times \frac{1}{2}}{\frac{\sqrt{3}}{2}} = 4\sqrt{3} \text{ N.} \\ \therefore r &= \frac{12}{\frac{\sqrt{3}}{2}} = 8\sqrt{3} \text{ N.} \end{aligned}$$

2

The side length of the base
 $= 40 \div 4 = 10 \text{ cm.}$

$$\begin{aligned} \text{Volume} &= \frac{1}{3} \times \text{base area} \times h \\ &= \frac{1}{3} \times (10)^2 \times 13 \\ &= \frac{1300}{3} \text{ cm}^3. \end{aligned}$$

2 Cairo

First Multiple choice questions

- (1) (c) (2) (b) (3) (d) (4) (a)
 (5) (b) (6) (a) (7) (d) (8) (a)
 (9) (c) (10) (b) (11) (d) (12) (c)
 (13) (a) (14) (b) (15) (c) (16) (d)
 (17) (b) (18) (c) (19) (a) (20) (d)

Second Essay questions

Second Essay questions

1

$$\because (100)^2 = (60)^2 + (80)^2$$

$\therefore \triangle ABC$ is right-angled triangle at C

From lami's rule :

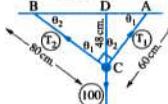
$$\frac{100}{\sin 90^\circ} = \frac{T_1}{\sin \theta_1} = \frac{T_2}{\sin \theta_2}$$

$$\therefore \sin \theta_1 = \frac{BC}{AB} = \frac{80}{100} = \frac{4}{5}$$

$$\therefore \sin \theta_2 = \frac{AC}{AB} = \frac{60}{100} = \frac{3}{5}$$

$$\therefore \frac{100}{1} = \frac{T_1}{\left(\frac{4}{5}\right)} = \frac{T_2}{\left(\frac{3}{5}\right)} \quad \therefore T_1 = 100 \times \frac{4}{5} = 80 \text{ gm.wt.}$$

$$\therefore T_2 = 100 \times \frac{3}{5} = 60 \text{ gm.wt.}$$



2

The centre of the circle is the midpoint of \overline{AB}

$$= \left(\frac{6+0}{2}, \frac{-4+2}{2} \right) = (3, -1)$$

$$\text{The diameter length} = \sqrt{(0-6)^2 + (2+4)^2} = 6\sqrt{2}$$

\therefore The radius $r = 3\sqrt{2}$

\therefore The equation of the circle is :

$$(x-3)^2 + (y+1)^2 = (3\sqrt{2})^2$$

$$\therefore x^2 + y^2 - 6x + 2y - 8 = 0$$

3 Cairo

First Multiple choice questions

- (1) (c) (2) (d) (3) (b) (4) (d)
 (5) (b) (6) (b) (7) (b) (8) (b)
 (9) (d) (10) (c) (11) (a) (12) (b)
 (13) (c) (14) (c) (15) (a) (16) (a)
 (17) (c) (18) (a) (19) (b) (20) (d)

Second Essay questions

1

$$\text{The radius} = \sqrt{(3-7)^2 + (-2-(-5))^2} = 5 \text{ length unit.}$$

\therefore The centre is $(7, -5)$

\therefore The equation of the circle is :

$$(x-7)^2 + (y+5)^2 = 25$$

2

$\therefore \triangle ABC$:

$$(AB) = \sqrt{10^2 - 6^2} = 8 \text{ cm.}$$

$\therefore \triangle ABC$ is a triangle of forces

$$\therefore \frac{R}{6} = \frac{T}{AB} = \frac{T}{AC}$$

$$\therefore \frac{R}{6} = \frac{24}{8} = \frac{T}{10}$$

$$\therefore \text{The tension } T = 10 \times \frac{24}{8} = 30 \text{ newton}$$

$$\therefore \text{The reaction of the wall } R = 6 \times \frac{24}{8} = 18 \text{ newton}$$

2

\therefore The wall is smooth

$\therefore \vec{R} \perp$ the wall

\therefore The set of forces are in equilibrium

$\therefore \vec{T}$ passes through M the point M

$\therefore \triangle ABM$ is the triangle of forces

$$AM = 2r, MB = r, AB = \sqrt{(2r)^2 - r^2} = \sqrt{3}r$$

$$\therefore \frac{T}{2r} = \frac{R}{r} = \frac{15}{\sqrt{3}r} \quad \therefore T = 10\sqrt{3} \text{ newton}$$

$$\therefore R = 5\sqrt{3} \text{ newton} \quad \therefore P = R = 5\sqrt{3} \text{ newton}$$

4 Giza

First Multiple choice questions

- (1) (d) (2) (a) (3) (d) (4) (c)
 (5) (b) (6) (c) (7) (c) (8) (a)
 (9) (b) (10) (b) (11) (d) (12) (a)
 (13) (d) (14) (d) (15) (a) (16) (c)
 (17) (d) (18) (a) (19) (c) (20) (a)

Second Essay questions

1

\therefore The quadrilateral pyramid is regular

$\therefore ABCD$ is a square

\therefore The area of the square ABCD = 9 cm.²

$\therefore AB = BC = 3 \text{ cm.}$

$\therefore \triangle ABC$ is right angled at B

$$\therefore AC = \sqrt{3^2 + 3^2} = 3\sqrt{2} \text{ cm.}$$

$\therefore N$ is a midpoint of \overline{AC}

$$\therefore AN = \frac{3\sqrt{2}}{2} \text{ cm.}$$

$\therefore \overline{MN} \perp \overline{AC}$

$\therefore \triangle MNA$ is a right angled at N

$$\therefore MN = \sqrt{5^2 - \left(\frac{3\sqrt{2}}{2} \right)^2} = \frac{\sqrt{82}}{2} \text{ cm.}$$

\therefore The volume of the pyramid = $\frac{1}{3} \times \text{base area} \times h$

$$= \frac{1}{3} \times 9 \times \frac{\sqrt{82}}{2} = \frac{3\sqrt{82}}{2} \text{ cm}^3.$$

2

\therefore The wall is smooth

$\therefore \vec{R} \perp$ the wall

\therefore The set of forces are in equilibrium

$\therefore \vec{T}$ passes through M the point M

$\therefore \triangle ABM$ is the triangle of forces

$$AM = 2r, MB = r, AB = \sqrt{(2r)^2 - r^2} = \sqrt{3}r$$

$$\therefore \frac{T}{2r} = \frac{R}{r} = \frac{15}{\sqrt{3}r} \quad \therefore T = 10\sqrt{3} \text{ newton}$$

$$\therefore R = 5\sqrt{3} \text{ newton} \quad \therefore P = R = 5\sqrt{3} \text{ newton}$$

5 Giza

First Multiple choice questions

- (1) (d) (2) (d) (3) (d) (4) (c)
 (5) (b) (6) (c) (7) (b) (8) (c)
 (9) (b) (10) (c) (11) (c) (12) (c)
 (13) (d) (14) (d) (15) (b) (16) (a)
 (17) (c) (18) (a) (19) (c) (20) (b)

Second Essay questions

1

Apply lami's rule :

$$\frac{18}{\sin 120^\circ} = \frac{F}{\sin 150^\circ} = \frac{r}{\sin 90^\circ}$$

$$\therefore F = \frac{18 \sin 150^\circ}{\sin 120^\circ}$$

$$= 6\sqrt{3} \text{ newton}$$

$$, r = \frac{18 \sin 90^\circ}{\sin 120^\circ} = 12\sqrt{3} \text{ newton}$$

2

\therefore The length of the diameter = 18 length units.

$\therefore r = 9$ length units.

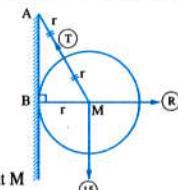
\therefore centre is $(-2, 3)$

\therefore The equation of the circle is :

$$(x+2)^2 + (y-3)^2 = 9^2$$

$$\therefore x^2 + 4x + 4 + y^2 - 6y + 9 = 81$$

$$\therefore x^2 + y^2 + 4x - 6y - 68 = 0$$



6**Alexandria****First Multiple choice questions**

- (1) (d) (2) (b) (3) (d) (4) (c)
 (5) (a) (6) (c) (7) (d) (8) (a)
 (9) (a) (10) (c) (11) (d) (12) (c)
 (13) (a) (14) (d) (15) (c) (16) (b)
 (17) (a) (18) (d) (19) (a) (20) (b)

Second Essay questions**1** ΔABC is a right angled triangle at $\angle C$

$$(AB)^2 = 60^2 + 80^2$$

$$\therefore AB = 100 \text{ cm.}$$

From lami's rule

$$\therefore \frac{200}{\sin 90^\circ} = \frac{T_1}{\sin \theta_1} = \frac{T_2}{\sin \theta_2}$$

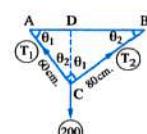
$$\therefore \sin \theta_1 = \frac{BC}{AB} = \frac{80}{100} = \frac{4}{5}, \sin \theta_2 = \frac{AC}{AB} = \frac{60}{100} = \frac{3}{5}$$

$$\therefore \frac{200}{1} = \frac{T_1}{\left(\frac{4}{5}\right)} = \frac{T_2}{\left(\frac{3}{5}\right)}$$

$$\therefore T_1 = 200 \times \frac{4}{5} = 160 \text{ gm.wt.}$$

$$, T_2 = 200 \times \frac{3}{5} = 120 \text{ gm.wt.}$$

$$\therefore |T_1 - T_2| = |160 - 120| = 40$$

**Second Essay questions****1**

$$\begin{aligned} X &= F \cos 0^\circ + 6 \cos 90^\circ + 4\sqrt{2} \cos 135^\circ \\ &\quad + 5\sqrt{2} \cos 225^\circ + k \cos 270^\circ \\ \therefore X &= F - 9 \\ Y &= F \sin 0^\circ + 6 \sin 90^\circ \\ &\quad + 4\sqrt{2} \sin 135^\circ \\ &\quad + 5\sqrt{2} \sin 225^\circ + k \sin 270^\circ \\ \therefore Y &= 5 - k \end{aligned}$$

 \therefore The resultant = 2 in direction of north

$$\therefore X = 0 \quad \therefore F - 9 = 0 \quad \therefore F = 9$$

$$\therefore Y = 2 \quad \therefore 5 - k = 2 \quad \therefore k = 3$$

2Draw $\overline{MC} \perp \overline{OA}$

$$\therefore MA = MO = r$$

 $\therefore C$ is the midpoint of \overline{OA}

$$\therefore C = \left(\frac{0+8}{2}, \frac{0+0}{2}\right)$$

$$C = (4, 0)$$

 $\therefore M \in$ the straight line $y = x$

$$\therefore \text{The coordinates of } M \text{ is } (4, 4), r = \sqrt{4^2 + 4^2} = 4\sqrt{2}$$

$$\therefore \text{The equation of the circle is } (x - 4)^2 + (y - 4)^2 = 32$$

8 El-Monofia**First Multiple choice questions**

- (1) (b) (2) (d) (3) (c) (4) (b)
 (5) (d) (6) (a) (7) (c) (8) (d)
 (9) (a) (10) (c) (11) (c) (12) (a)
 (13) (b) (14) (d) (15) (c) (16) (d)
 (17) (d) (18) (c) (19) (c) (20) (b)

Second Essay questions**1**Let \overrightarrow{AB} in the direction of \overrightarrow{OX}

$$\begin{aligned} \therefore X &= 2 \cos 0^\circ + 4\sqrt{3} \cos 30^\circ \\ &\quad + 8 \cos 60^\circ + 2\sqrt{3} \cos 90^\circ \\ &\quad + 4 \cos 120^\circ \\ &= 2 \times 1 + 4\sqrt{3} \times \frac{\sqrt{3}}{2} + 8 \times \frac{1}{2} \\ &\quad + 2\sqrt{3} \times 0 + 4 \times \frac{-1}{2} = 10 \end{aligned}$$

7 El-Kalyoubia**First Multiple choice questions**

- (1) (a) (2) (b) (3) (c) (4) (c)
 (5) (c) (6) (d) (7) (d) (8) (b)
 (9) (d) (10) (b) (11) (a) (12) (c)
 (13) (d) (14) (c) (15) (d) (16) (c)
 (17) (d) (18) (c) (19) (c) (20) (c)

Second Essay questions

$$\begin{aligned} X &= F \cos 0^\circ + 6 \cos 90^\circ + 4\sqrt{2} \cos 135^\circ \\ &\quad + 5\sqrt{2} \cos 225^\circ + k \cos 270^\circ \\ \therefore X &= F - 9 \\ Y &= F \sin 0^\circ + 6 \sin 90^\circ \\ &\quad + 4\sqrt{2} \sin 135^\circ \\ &\quad + 5\sqrt{2} \sin 225^\circ + k \sin 270^\circ \\ \therefore Y &= 5 - k \end{aligned}$$

 \therefore The resultant = 2 in direction of north

$$\therefore X = 0 \quad \therefore F - 9 = 0 \quad \therefore F = 9$$

$$\therefore Y = 2 \quad \therefore 5 - k = 2 \quad \therefore k = 3$$

$$\begin{aligned} Y &= 2 \sin 0^\circ + 4\sqrt{3} \sin 30^\circ + 8 \sin 60^\circ \\ &\quad + 2\sqrt{3} \sin 90^\circ + 4 \sin 120^\circ \\ &= 2 \times 0 + 4\sqrt{3} \times \frac{1}{2} + 8 \times \frac{\sqrt{3}}{2} + 2\sqrt{3} \times 1 + 4 \times \frac{\sqrt{3}}{2} \\ &= 10\sqrt{3} \\ \therefore \vec{R} &= 10\hat{i} + 10\sqrt{3}\hat{j} \\ \therefore R &= \sqrt{(10)^2 + (10\sqrt{3})^2} = 20 \text{ kg.wt.} \\ \tan \theta &= \frac{10\sqrt{3}}{10} = \sqrt{3} \quad \therefore \theta = 60^\circ \\ \therefore \text{The magnitude of } \vec{R} &= 20 \text{ kg.wt. and its direction makes an angle of measure } 60^\circ \text{ with } \overrightarrow{AB} \end{aligned}$$

2

The length of the perpendicular drawn from the centre (1, 1) to the straight line

$$= \frac{|3(1) + 4(1) + 23|}{\sqrt{3^2 + 4^2}} = 6 = r$$

$$\therefore \text{The equation of the circle is } (x - 1)^2 + (y - 1)^2 = 36$$

9 El-Dakahlia**First Multiple choice questions**

- (1) (c) (2) (b) (3) (d) (4) (b)
 (5) (a) (6) (a) (7) (a) (8) (b)
 (9) (a) (10) (c) (11) (c) (12) (c)
 (13) (c) (14) (c) (15) (d) (16) (b)
 (17) (d) (18) (a) (19) (c) (20) (a)

Second Essay questions**1** \therefore The two planes are smooth $\therefore r_1$ and r_2 are

perpendicular to the two planes and passing through the center of the sphere

Applying lami's rule

$$\therefore \frac{r_1}{\sin 150^\circ} = \frac{r_2}{\sin 90^\circ} = \frac{400}{\sin 120^\circ}$$

$$\therefore r_1 \text{ (The reaction of the vertical plane)} = \frac{400\sqrt{3}}{3} \text{ kg.wt.}$$

$$\therefore r_2 \text{ (The reaction of the inclined plane)} = \frac{800\sqrt{3}}{3} \text{ kg.wt.}$$

2Volume of the pyramid = $\frac{1}{3}$ base area \times height

$$\therefore 1296 = \frac{1}{3} \times (18)^2 \times \text{height}$$

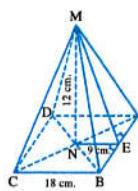
$$\text{height} = 12 \text{ cm.}$$

$$\text{The slant height} = \sqrt{9^2 + (12)^2}$$

$$= 15 \text{ cm.}$$

The lateral area

$$= \frac{1}{2} \times (4 \times 18) \times 15 = 540 \text{ cm}^2.$$

**10 Damietta****First Multiple choice questions**

- (1) (c) (2) (c) (3) (a) (4) (d)
 (5) (b) (6) (a) (7) (b) (8) (b)
 (9) (b) (10) (d) (11) (a) (12) (b)
 (13) (c) (14) (d) (15) (c) (16) (c)
 (17) (d) (18) (c) (19) (c) (20) (a)

Second Essay questions**1**

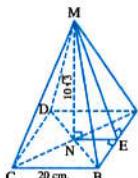
The slant height

$$= \sqrt{(10)^2 + (10\sqrt{3})^2}$$

$$= 20 \text{ cm.}$$

The lateral area

$$= \frac{1}{2} \times (4 \times 20) \times 20 = 800 \text{ cm}^2.$$

**2**

Applying lami's rule

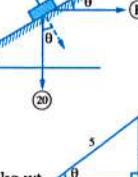
$$\frac{20}{\sin(90^\circ + \theta)} = \frac{r}{\sin 90^\circ}$$

$$= \frac{F}{\sin(180^\circ - \theta)}$$

$$\therefore \frac{20}{\cos \theta} = \frac{r}{1} = \frac{F}{\sin \theta}$$

$$\therefore F = \frac{20 \times \sin \theta}{\cos \theta} = \frac{20 \times \left(\frac{3}{5}\right)}{\left(\frac{4}{5}\right)} = 15 \text{ kg.wt.}$$

$$\therefore r = \frac{20}{\cos \theta} = \frac{20}{\left(\frac{4}{5}\right)} = 25 \text{ kg.wt.}$$



11**El-Beheira****First Multiple choice questions**

- (1) (c) (2) (c) (3) (a) (4) (c)
 (5) (a) (6) (b) (7) (c) (8) (a)
 (9) (d) (10) (c) (11) (c) (12) (d)
 (13) (c) (14) (a) (15) (b) (16) (c)
 (17) (d) (18) (b) (19) (a) (20) (b)

Second Essay questions**1**

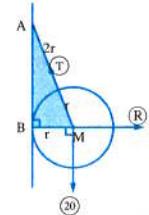
ΔABM is the triangle of forces

$$\therefore AB = \sqrt{(3r)^2 - r^2} = 2\sqrt{2}r$$

$$\therefore \frac{R}{r} = \frac{20}{2\sqrt{2}r} = \frac{T}{3r}$$

$$\therefore P = R = 5\sqrt{2} \text{ newton}$$

$$\therefore T = 15\sqrt{2} \text{ newton.}$$

**2**

The formed solid is two cones

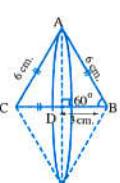
with common base and equal heights

$$\therefore r = 6 \sin 60^\circ = 3\sqrt{3} \text{ cm.}$$

$$\therefore h = 3 \text{ cm.}$$

∴ The volume of each cone

$$= \frac{1}{3}\pi(3\sqrt{3})^2 \times 3 = 27\pi \text{ cm}^3$$

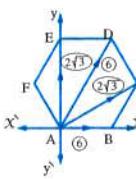
∴ The volume of the whole solid = $54\pi \text{ cm}^3$ **12****Beni-Suef****First Multiple choice questions**

- (1) (a) (2) (b) (3) (c) (4) (b)
 (5) (c) (6) (c) (7) (b) (8) (c)
 (9) (a) (10) (c) (11) (d) (12) (b)
 (13) (c) (14) (b) (15) (a) (16) (a)
 (17) (c) (18) (a) (19) (d) (20) (b)

Second Essay questions**1**

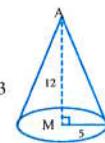
$$\begin{aligned} X &= 6 \cos 0^\circ + 2\sqrt{3} \cos 30^\circ \\ &\quad + 6 \cos 60^\circ + 2\sqrt{3} \cos 90^\circ \\ \therefore X &= 12 \text{ newton} \end{aligned}$$

$$\begin{aligned} Y &= 6 \sin 0^\circ + 2\sqrt{3} \sin 30^\circ \\ &\quad + 6 \sin 60^\circ + 2\sqrt{3} \sin 90^\circ \\ \therefore Y &= 6\sqrt{3} \text{ newton} \end{aligned}$$

**2**

$$AB = \sqrt{12^2 + 5^2} = 13 \text{ cm.}$$

$$\begin{aligned} \therefore \text{The total area} &= \pi r^2 + \pi r l \\ &= \pi(5)^2 + \pi \times 5 \times 13 \\ &= 90\pi \text{ cm}^2 \\ &\approx 282.7 \text{ cm}^2. \end{aligned}$$

**13 El-Menia****First Multiple choice questions**

- (1) (d) (2) (b) (3) (c) (4) (b)
 (5) (d) (6) (d) (7) (b) (8) (b)
 (9) (d) (10) (a) (11) (b) (12) (a)
 (13) (d) (14) (b) (15) (c) (16) (d)
 (17) (c) (18) (a) (19) (c) (20) (a)

Second Essay questions**1**

∴ The quadrilateral pyramid is regular

∴ The base is a square its side length = 10

∴ The base area = $(10)^2 = 100 \text{ cm}^2$ ∴ The lateral area = $60 \times 4 = 240 \text{ cm}^2$ ∴ The total area = $240 + 100 = 340 \text{ cm}^2$ **2**

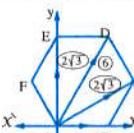
$$\begin{aligned} X &= 6 \cos 0^\circ + 2\sqrt{3} \cos 30^\circ \\ &\quad + 6 \cos 60^\circ + 2\sqrt{3} \cos 90^\circ \end{aligned}$$

∴ $X = 12 \text{ newton.}$

$$\begin{aligned} Y &= 6 \sin 0^\circ + 2\sqrt{3} \sin 30^\circ \\ &\quad + 6 \sin 60^\circ + 2\sqrt{3} \sin 90^\circ \\ \therefore Y &= 6\sqrt{3} \text{ newton.} \end{aligned}$$

$$\therefore Y = 6\sqrt{3} \text{ newton.}$$

$$\begin{aligned} R &= \sqrt{(12)^2 + (6\sqrt{3})^2} \\ &= 6\sqrt{7} \text{ newton} \end{aligned}$$

**14 Assiut****First Multiple choice questions**

- (1) (c) (2) (b) (3) (d) (4) (d)
 (5) (b) (6) (d) (7) (c) (8) (b)
 (9) (c) (10) (c) (11) (c) (12) (b)
 (13) (a) (14) (a) (15) (d) (16) (b)
 (17) (b) (18) (c) (19) (b) (20) (d)

Second Essay questions**1**

$$\therefore \vec{R} \perp \vec{F}$$

$$\therefore F + 2 \cos 120^\circ = 0$$

$$\therefore F = 1$$

2

$$\therefore X = 4 \cos 0^\circ + 2 \cos 60^\circ$$

$$+ 5 \cos 120^\circ$$

$$+ 3\sqrt{3} \cos 210^\circ$$

$$= 4 \times 1 + 2 \times \frac{1}{2} + 5 \times -\frac{1}{2}$$

$$+ 3\sqrt{3} \times -\frac{\sqrt{3}}{2} = -2$$

$$\therefore Y = 4 \sin 0^\circ + 2 \sin 60^\circ + 5 \sin 120^\circ + 3\sqrt{3} \sin 210^\circ$$

$$= 4 \times 0 + 2 \times \frac{\sqrt{3}}{2} + 5 \times \frac{\sqrt{3}}{2} + 3\sqrt{3} \times -\frac{1}{2} = 2\sqrt{3}$$

$$\therefore \vec{R} = -2\hat{i} + 2\sqrt{3}\hat{j}$$

$$\therefore R = \sqrt{(-2)^2 + (2\sqrt{3})^2} = 4 \text{ newton}$$

$$\tan \theta = \frac{2\sqrt{3}}{-2} = -\sqrt{3}$$

$$\therefore X < 0 \quad \therefore Y > 0 \quad \therefore \theta = 120^\circ$$

15**Qena****First Multiple choice questions**

- (1) (a) (2) (d) (3) (a) (4) (d)
 (5) (c) (6) (b) (7) (c) (8) (b)
 (9) (b) (10) (c) (11) (b) (12) (a)
 (13) (d) (14) (a) (15) (b) (16) (b)
 (17) (a) (18) (a) (19) (b) (20) (a)

Second Essay questions**1**

The wall is smooth

∴ $\vec{R} \perp \text{the wall}$ ∴ The set of forces are
in equilibrium

∴ T passes through the point M

∴ ΔABM is the triangle of forces

$$\therefore AB = \sqrt{50^2 - 25^2} = 25\sqrt{3}$$

$$\therefore \frac{T}{50} = \frac{r}{25} = \frac{1.5}{25\sqrt{3}}$$

$$\therefore T = \sqrt{3} \text{ kg.wt.}, \quad r = \frac{\sqrt{3}}{2} \text{ kg.wt.}$$

2The equation of the circle is $(x-1)^2 + (y-5)^2 = 6^2$

$$\therefore x^2 + y^2 - 2x - 10y - 10 = 0$$

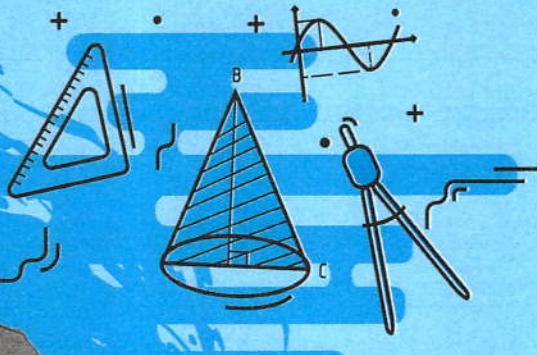
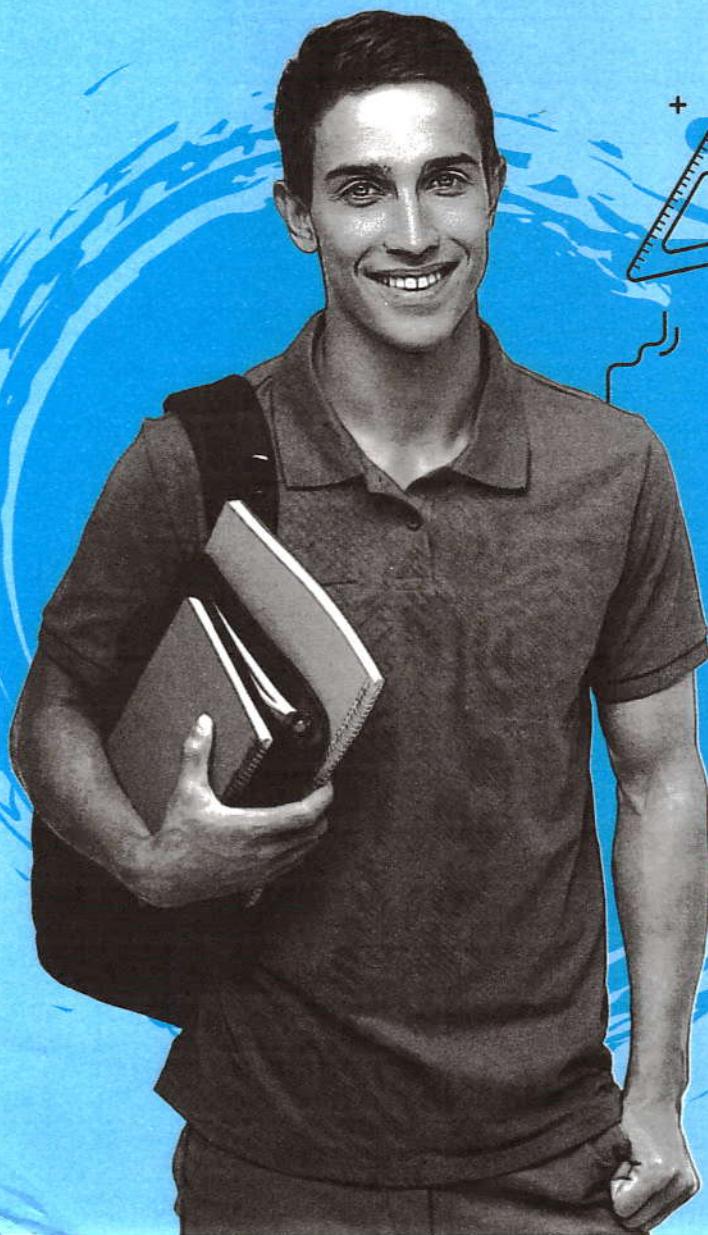
Notes



For the next term ask for



**in Maths, Hello English, Physics,
Chemistry, Biology & French**



**2nd
Sec.
Second Term**