Roll No: | | | | | | | |

**SUMMATIVE ASSESSMENT-2 (2014-15)**

**CLASS X**

**Sub: MATHEMATCS(NVEQF)**

Time Allowed : 3 hours M.M: 90

General Instructions:

(i) All questions are compulsory.

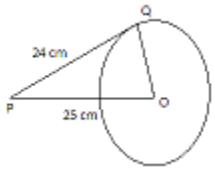
(ii) The question paper contains of 31 questions divided into four sections A, B,C and D. Section A contains 4 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each and section D contains 11 questions of 4 marks each.

(iii) Use of calculators is not permitted.

SECTION—A

**1.** If 2 , K and 26 are in A.P . find the value of K.

**2.** From a point P, the length of a tangent to a circle is 24 cm and distance of point P from the centre of the circle is 25cm . Find radius of the circle.




**3.** Radius of a wheel is 35cm. Find distance covered by the wheel in one revolution. (use $\pi=\frac{22}{7}$ )

**4.** Shadow of a tower is equal to its height .Find the Sun 's altitude .

SECTION-B

**5.** Solve for x:

$3x^2-8x+5=0$

6. Find discriminant of quadratic equation $4X^2-3X-1=0$.Also write nature of roots.

7. Prove that the tangents at the end points of a diameter of a circle are parallel.

8. Find area of a sector of a circle whose radius is 3.5 cm and sector angle is $60^0$ .(Use $\pi=22/7$)

9. Represent the following situation as quadratic equation:

Sum of a number and its reciprocal is $\frac{17}{4}$.

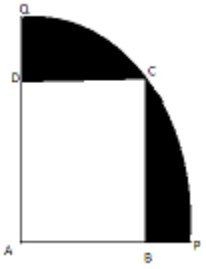
10. Radius of a semi-circular protector is 3.5cm.Find its perimeter ($\pi$=22/7)

SECTION-C

11. For what value of K the quadratic equation $2x^2-kx+\frac{1}{2}=0$ has equal roots.
12. Solve the following quadratic equation by completing square.

$2X^2 -7X +3=0$

13. Prove that the angle between two tangents drawn from an external point to a circle is supplementory to the angle subtended by the line segment joining points of contact at the center.
14. Prove that the tangents drawn from an external point to a circle are equal in length.
15. A square ABCD is inscribed in a quadrant APCD. If AB=14cm ,find the area of shaded region. (use $\pi$=22/7) Fig.




16. From a solid cube of 10cm a hemi-spherical cavity of 3.5cm is hollowed out. Find total surface area of the new solid.(Use $\pi$=22/7)
17. A toy is in the form of a cone mounted on a hemi-sphere of same radius 7cm . If the total height of the toy is 22cm . Find volume of the toy.(Use $\pi$=22/7)
18. A metallic sphere of radius 9cm is melted and drawn into a cylindrical wire of radius 1mm. Find length of the wire in meter.
19. The product of two consecutive positive even numbers is 80. Find them.
20. A conical tent of height 6m and base diameter 16m is to be made by canvas .Find the cost of canvas used at the rate of Rs98/$m^2$.

SECTION- D

21. Solve for x:

$$\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{4}$$

22. The diagonal of a rectangular field is 60m more than the shortest side. If longer side is 30m more than the shortest side .Find sides of the rectangle.
23. Rs. 6400 were divided equally among certain number of persons . Had there been 10 more persons each would have got Rs. 32 less. Find original number of persons.
24. A parallelogram ABCD is circumscribing a circle. Prove that ABCD is a rhombus.
25. ABC is a right triangle with angle B=$90^0$ , AB=24cm and BC=7cm . A circle has been inscribed inside the triangle .Find radius of the circle.

26. As observed from the top of 75m high light house the angle of depressions of two ships in the sea are $30^0$ and $45^0$ . If one ship is exactly behind the other on the same side of the light house. Find distance between the two ships.

27. If the angle of elevation of a jet plane from a point on the ground is $60^0$. After a flight of 20 seconds the angle of elevation becomes $30^0$ . If the jet plane is flying at a constant height of $2400\sqrt{3}$ m. Find the speed of the jet plane.

28. AB and CD are two parallel tangents to a circle C(O,r) . Another tangent to the circle intersects AB at P and CD at Q. Prove that PQ subtends right angle at O.

29. Two poles of equal height are on either side of a 50m. wide road. The angles of elevation of top of the poles are $60^0$ and $30^0$ at a point on the road between the poles. Find position of the point and height of each pole.

30. A person donated a full bucket milk to a hospital to distribute among the patients . The bucket is in the form of a frustum of a cone of height 15cm and end radii 16cm and 20cm. Patients have cylindrical tumblers of radius 4cm and height 5cm. If full tumbler milk is given to each patient , find the number of patients who got milk. Write the moral value depicted in the question .

31. Water is flowing at the rate of 15km/hr through a pipe of diameter 14cm into a rectangular tank which is 50m long and 44m wide . Find the time in which level of water in tank will raise by 21cm. (Use $\pi=22/7$).

**Summative assessment-II (2014-15)**

**Sub- Mathematics(NVQM)**

**Class X**

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| Marks | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Algebra (28) | 1 | 3 | 3 | 3 |
| Geometry (21) | 1 | 1 | 2 | 3 |
| Trigonometry (13) | 1 | -------- | ---------- | 3 |
| Mensuration (28) | 1 | 2 | 5 | 2 |
| | | | | |

**TOTAL = 90 MARKS**

MARKING SCHEME
S A II 2014-15
Mathematics –x(Normal course)

**Section-A**

**1.** K-2=26-k 1/2 mrk

K=28/2=14 1/2 mrk

**2.** <PQO=$90^0$

r=$\sqrt{PO^2-PQ^2}$ 1/2mrk

= $\sqrt{25^2-24^2}$

=7cm ½mrk

**3.** Distance covered=$2\pi r$ ½mrk

=$2x\frac{22}{7}$ x35 cm= 220cm ½mrk

**4** correct fig ½ mrk

Calculating sun's altitude=$45^0$ ½

**SECTION-B**

**5 .** $3x^2-8x+5=0$ ½ markfor each correct step

$3x^2-3x-5x+5=0$

$3x(x-1)-5(x-1)=0$

$(x-1)(3x=5)=0$

Either $(x-1)=0$ or, $(3x-5)=0$

$X=1$ or, $x=3$

**6.** a=4,b= -3,c= -1 ½ mrk

$D= b^2-4ac$ ½ mrk

$=(-3)^2-4.4(-1)$

=9+16=25 ½ mrk

Equation has two distinct real roots ½ mark

**7.** For correct fig. ½ mark

For correct proof $1\frac{1}{2}$ mark

**8.** r=3.5cm , $\Theta=60^0$ 1/2markfor each correct step

Area of asector= $\pi r^2 \Theta/360$

$=\frac{22X3.5X3.5X60}{360}$

$=38.5x\frac{1}{6}$

=6.42 $cm^2$ (approx.)

**9.** No. of possible outcomes= 20 1/2markfor each correct step

Favourable outcomes, 6,12,18.

No. of Favourable outcomes=3

P(E)=$\frac{3}{20}$

**10.** possible outcomes= HH, HT, TH , TT 1/2mark

Favourable outcomes == HH, HT, TH 1/2mark

No. of possible outcomes=4

No. of favourable outcomes=3

P( getting at least one head)= $\frac{3}{4}$ 1mark

**SECTION-C**

**11 .** For equal roots

$b^2$-4ac=0 1mark

$[-K]^2$-4 X 2x $\frac{1}{2}$=0 1mark

$K^2$-4=0

$K^2$=4

K=$\pm 2$ 1 mrk

**12**. $2X^2$ -7X +3=0

Completing square 2mrks

Getting values of X=3, $\frac{1}{2}$ 1 mrk

**13** . Given ,to prove, fig $1\frac{1}{2}$mark

Correct proof $1\frac{1}{2}$marks

**14.** Given, to prove , fig. and const. 1mark

Correct proof 2marks

**15.** AC=14√2 cm

Radius of the quadrant =14√2 cm 1mark

Area of the quadrat=$\frac{1}{4}$. $\frac{22}{7}$ . 14√2 cm14√2 cm =308$cm^2$ 1mrk

Area of the square=14x14=196$cm^2$ 1/2mark

Area of the shaded region =308-196=112$cm^2$ 1/2mark

**16**.S.A. of the new solid=S.A. of the cube+ C.S.A. of hemi-sphere - area of face of hemisphere.

=6x10x10+2$\pi$ $r^2$ - $\pi$ $r^2$

=600+ $\pi$ $r^2$ 1/2mark for each correct step

=600+$\frac{22}{7}$ x3.5x3.5

=600+28.5

=628.5$cm^2$

**17.** Radius (r)= 7cm

Height of the conical part=22-7 cm=15cm 1/2mark

Vol. of the toy= Vol. of hemi-sphere+ Vol. of the cone 1/2mark

=$\frac{2}{3}$ $\pi$ $r^3$ + $\frac{1}{3}\pi$ $r^2$h 1/2mark

= $\frac{1}{3}\pi$ $r^2$(2r+h) 1/2mark

= $\frac{1}{3}$ .$\frac{22}{7}$ .7.7 (14+15)

= $\frac{1}{3}$.22.7.29 $cm^3$ 1/2mark

= $1488\frac{2}{3}$ $cm^3$ 1/2mark

**18.** Radius of the sphere (R) =9cm

VOI. of the sphere= $\frac{4}{3}$ $\pi$ $R^3$

= $\frac{4}{3}$ $\pi$ $9^3$ $cm^3$ 1mark

Radius of the wire (r)=1mm= $\frac{1}{10}$ cm

Let length of the wire be x cm

Vol. of the wire = $\pi$ $r^2$h

= $\pi$. $\frac{1}{10}$cm. $\frac{1}{10}$cm. xcm 1mark

Vol. of wire = vol. of sphere

$\pi$. $\frac{1}{10}$cm. $\frac{1}{10}$cm. xcm = $\frac{4}{3}$ $\pi$ $9^3$ $cm^3$

X = 4 x 81 x 3 x 100 cm

= 4 x 81 x 3 m

= 972m 1mark

**19.** Let two consecutive numbers are X and (X+2) $\frac{1}{2}$ mrk

A.T.Q X(x+2)=80

$X^2+2X-80=0$ 1 mrk

Solving for 'X' = -10, or 8 1 mrk

Numbers are = 8,10 $\frac{1}{2}$ mrk

**20.** Height of conical tent(h)=6 m

Diameter= 16m

Radius (r)= 8m $\frac{1}{2}$ mrk

Calculating slant height(l)= 10m $\frac{1}{2}$ mrk

C.S.A= $\pi$ r l=$\frac{22}{7}$ X8 X10 $m^2$ 1 mrk

Cost of canvas=$\frac{22}{7}$ X8 X10 $m^2$ X Rs 98=Rs .24640 1 mrk

# SECTION-D

**21.** $\frac{x+3}{x-2} - \frac{(1-x)}{x} = \frac{17}{4}$

$\frac{x(x+3)-(x-2)(1-x)}{x(x-2)} = \frac{17}{4}$ 2mrk

$\frac{x2+3x-(x-x2-2+2x))}{x2-2x} = \frac{17}{4}$ 1/2mark

$\frac{x2+3x-x+x2+-2x}{x2-2x} = \frac{17}{4}$ 1/2mrk

$\frac{2x2+2}{x2-2x} = \frac{17}{4}$ 1/2mark

$17x^2 - 34x = 8x^2 + 8$

$9x^2 - 34x - 8 = 0$ 1/2mark

$9x^2 - 36x + 2x - 8 = 0$

$9x(x-4) + 2(x-4) = 0$

$(x-4)(9x+2) = 0$ 1mark

Either $x - 4 = 0$ or ,$9x+2 = 0$

X=4 or , x= $\frac{-2}{9}$ 1/2mark

**22.** Let the shorter side be X

Then diagonal= X+60

And longer side = X+30 1mark

By pytagoras theorem

$(X+60)^2=X^2+(x+30)^2$

$X^2$-60x-2700=0 1 1mrk

(x-90)(X+30)=0

X=90, -30(not possible) 1mrk

Therefore shorter side=90m

Diagonal=150m

Longer side=120m 1 mrk

**23.** **Let** original no. of persons = x

New no. of persons = x +10 1/2mark

Amount to be divided equally = Rs 6400

Original share per person = Rs $\frac{6400}{x}$ 1/2mrk

New share per person = Rs $\frac{6400}{x+10}$ 1/2mark

A.t.q

Rs $\frac{6400}{x}$ - Rs $\frac{6400}{x+10}$ = 32 1/2mark

$\frac{6400\,.10}{x(x+10)}$ = 32

$\frac{64000}{x2+10x}$ = 32

$32(x^2+10x) = 64000$

$x^2+10x = 2000$

$x^2+10x - 2000 = 0$

(x+50)(x-40) = 0 1mark

Either x+50 = 0 or , x-40 = 0

X = -50 or x= 40 1/2mark

Rejecting x= -50

:- Original no. of persons = 40 2mark

**24.**

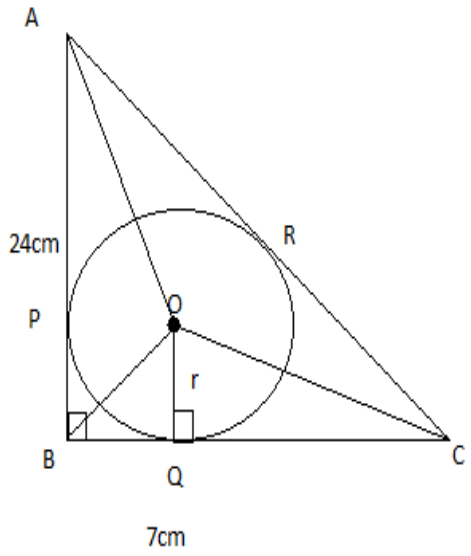
Given,To prove ,Correct fig. $1\frac{1}{2}$mark

Proving AB +CD = BC + AD $1\frac{1}{2}$mark

Proving parallelogram as rhombus 1mark

**25.** For fig. 1/2mark

AC = $\sqrt{24^2 + 7^2}$ = 25cm 1/2mark




Area of trig. ABC = $\frac{1}{2}$ x 7 x24 = 84 $cm^2$ 1/2mark

Area of trig ABC = Area of trig. AOB + Area of trig BOC + Area of trig. AOC 1/2Mark

84 = $\frac{1}{2}$.24.r + $\frac{1}{2}$.7.r + $\frac{1}{2}$.25.r 1/2Mark

84 = $\frac{1}{2}$.r(24+7+25) ½ mark

84= 28r 1/2mark

r = 3cm 1/2mark

**26.** In fig. AB is the light house, C and D are positions of ships

In rt. triangle BAD

$\frac{AB}{AD}$ = tan45$^0$

$\frac{75m}{AD}$ =*1*

AD=75m ……. (1) 1mark

In rt. triangle BAC

$\frac{AB}{AC}$ = tan30$^0$

$\frac{75m}{AC}$ =$\frac{1}{\sqrt{3}}$

*AC=75*$\sqrt{3}$ ***m*** ***1 mark***

Distance between the two ships =AC – AD

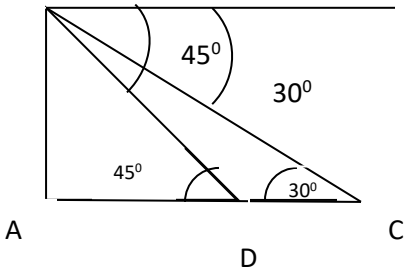
**=** *75*$\sqrt{3}$*m* – *7*5m

= 75($\sqrt{3} - 1$ )m

= 75 ( 1.732 – 1) m B

= 75 x .732m 1 mark for figure

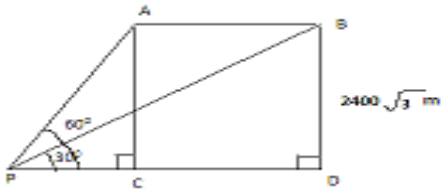
= 54.9m 1mark




**27.** P is a point on ground

A and B are positions of jet plane

In right triangle PCA




1 mrk

$\frac{AC}{PC}$= tan60$^0$

$\frac{2400\sqrt{3}}{PC}$= $\sqrt{3}$

PC=2400m 1 mrk

In right triangle PDB

$\frac{BD}{PD}$=tan30$^0$

$\frac{2400\sqrt{3}}{PD}=\frac{1}{\sqrt{3}}$

PD=7200m 1mrk

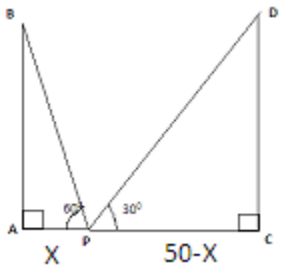
Distance covered in20s (CD)=7200-2400=4800m ½ mrk

Speed= $\frac{4800m}{20\ s}$=240m/s ½ mrk

**28.** Given ,to prove,fig ,construction 2mrk

Correct proof 2 mrk

**29.**




AB and CD are two poles of equal height.

AC=50m wide road,P is a point on the road .

AP=x ,So PC= 50-X 1 mrk

In rt. tri . APB

$\frac{AB}{AP}$=tan $60^0$

$\frac{AB}{X}=\sqrt{3}$

AB= $X\sqrt{3}$ eqn (1) 1 mrk

In rt. tri . PCD

$\frac{CD}{CP}$=tan $30^0$

$\frac{AB}{50-X}=\frac{1}{\sqrt{3}}$ (as AB=CD)

AB=$\frac{50-X}{\sqrt{3}}$ eqn(2) 1 mrk

From eqn (1) and eqn (2)

X$\sqrt{3}$ =$\frac{50-X}{\sqrt{3}}$

3X=50-X

4X=50

X=12.5 m ½ mrk

Distance of point from first pole= 12.5m

Height of poles=12.5 $\sqrt{3}$ m ½ mrk

**30**. FOR Frustum

R=20, r=16, h=15 1/2mrk

Vol of frustum=$\frac{1}{3}\pi h(R2 + r2 + Rr)$ 1/2mrk

$\frac{1}{3}\pi 15(20.20 + 16.16 + 20.16)$ cm$^3$

=5$\pi$ x976cm$^3$ 1/2mrk

For cylindrical tumbler

h =5cm ,r=4cm

volume=$\pi$r$^2$h 1/2mrk

=$\pi$(4)$^2$5cm$^3$=80 $\pi$ cm$^3$ 1mrk

No. of patients who got milk= $\frac{volume\ of\ bucket}{volume\ of\ a\ tumbler}$ ½ mrk

=$\frac{5\pi.976}{80\pi}$=61 persons ½ mrk

**31.**Diameter of the pipe=14cm

Radius(r) =7cm=7/100m
Speed of water=15km/hr=15000m/hr 1/2mrk
Volume of water flown through pipe in one hour=$\pi$ r$^2$h 1/2mrk

=$\frac{22}{7}$ x$\frac{7}{100}$ x $\frac{7}{100}$ x15000 m$^3$ 1/2 mrk
=11x7x3 m$^3$ 1mrk
Volume of water in tank =50m X44m X$\frac{21}{100}$m
=22X21 m$^3$ 1 mrk
Time required=$\frac{22\ X21}{11\ X\ 7\ X\ 3}$ hrs=2 hrs ½ mrk