ONE MARK & TWO MARKS SPECIAL TEST, 2011 - 2012

STANDARD X

MATHEMATICS

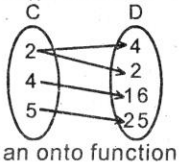
TEST NO:1

Time : 1.30 hrs.] **[Marks : 75**

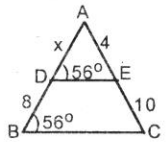
[Sets and Functions (1–33) , Geometry (171–195), Trigonometry (196–218)]

PART – I **25X1=25**

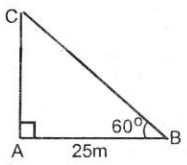
Note: Answer ALL the questions. Choose the correct answer and write the alphabet only :

1. Set of all even prime number (s) is
   a) an infinite set b) a null set c) a singleton set d) none of these
2. A = {3,5}, B :A $\rightarrow$ A is called
   a) an onto function b) one to one function c) a constant function d) identity function
3. If A = {p,q,r,s}, B = {r,s,t,u} , then A\B is
   a) {p,q} b) {t,u} c) {r,s} d) {p,q,r,s}
4. If n[p(A)] = 64 , then n(A) is a) 6 b) 8 c) 4 d) 5
5. A,B and C are three sets then B\(A $\cup$ C) is
   a) (A\B) $\cap$ (A\C) b) (B\A) $\cap$ (B\C) c) (B\A) $\cap$ (A\C) d) (A\B) $\cap$ (B\C)
6. If {(x,2), (4,y)} represents an identity function, then (x,y) is
   a) (2,4) b) (4,2) c) (2,2) d) (4,4)
7. Let A = {1,3,4,7,11}, B = {–1,1,2,5,7,9} and f:A $\rightarrow$ B be given by f = {(1,–1) , (3,2) , (4,1), (7,5), (11,9)}. Then f is a) one-one b) onto c) bijective d) not a function
8. 

   The given diagram represents
   a) an onto function b) a constant function c) an one-one function d) not a function
9. If f:A $\rightarrow$ B is a bijective function and if n(A) = 5, then n(B) is equal to
   a) 10 b) 4 c) 5 d) 25
10. If a straight line intersects sides AB and AC of a Δ ABC at D and E respectively and is parallel to BC, then $\frac{AE}{AC}$ =
    a) $\frac{AD}{DB}$ b) $\frac{AD}{AB}$ c) $\frac{DE}{BC}$ d) $\frac{AD}{EC}$
11. In the figure, the value 'x' is equal to
    a) 4.2 b) 3.2
    c) 0.8 d) 0.4



12. In triangle ABC and DEF, $\angle B = \angle E$, $\angle C = \angle F$, then
    a) $\frac{AB}{DE} = \frac{CA}{EF}$ b) $\frac{BC}{EF} = \frac{AB}{FD}$ c) $\frac{AB}{DE} = \frac{BC}{EF}$ d) $\frac{CA}{FD} = \frac{AB}{EF}$
13. The sides of two similar triangles are in the ratio 2:3, then their areas are in the ratio
    a) 9:4 b) 4:9 c) 2:3 d) 3:2
14. If the tangents PA and PB from an external point P to circle with centre O are inclined to each other at an angle of 40^o then $\angle POA$ =
    a) 70^o b) 80^o c) 50^o d) 60^o
15. The areas of two similar triangles are $16cm^2$ and $36cm^2$ respectively. If the altitude of the first triangle is 3 cm, then the corresponding altitude of the other triangle is
    a) 6.5 cm b) 6 cm c) 4 cm d) 4.5 cm
16. The perimeter of two similar triangles Δ ABC and Δ DEF are 36 cm and 24 cm respectively. If DE = 10 cm, then AB is
    a) 12 cm b) 20 cm c) 15 cm d) 18 cm
17. Chords AB and CD cut at P inside a circle. If AB = 11, AP = 3 and CP = 6 then CD is
    a) 4 b) 6 c) 8 d) 10
18. $(1-\sin^2\theta)\sec^2\theta$ = a) 0 b) 1 c) $\tan^2\theta$ d) $\cos^2\theta$
19. If $x = a\sec\theta$, $y = b\tan\theta$, then the value of $\frac{x^2}{a^2} - \frac{y^2}{b^2}$ =
    a) 1 b) – 1 c) $\tan^2\theta$ d) $\text{cosec}^2\theta$
20. In the adjoining figure, AC =
    a) 25 m b) $25\sqrt{3}$ m
    c) $\frac{25}{\sqrt{3}}$ m d) $25\sqrt{2}$ m



21. $(1+\tan^2\theta)(1-\sin\theta)(1+\sin\theta)$ =
    a) $\cos^2\theta - \sin^2\theta$ b) $\sin^2\theta - \cos^2\theta$ c) $\sin^2\theta + \cos^2\theta$ d) 0

22. $(\cos^2\theta - 1)(\cot^2\theta + 1) + 1 =$ a) 1 b) – 1 c) 2 d) 0

23. $\sin^2\theta + \frac{1}{1+\tan^2\theta} =$

a) $\text{cosec}^2\theta + \cot^2\theta$ b) $\text{cosec}^2\theta - \cot^2\theta$ c) $\cot^2\theta - \text{cosec}^2\theta$ d) $\sin^2\theta - \cos^2\theta$

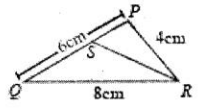
24. $9\tan^2\theta - 9\sec^2\theta =$ a) 1 b) 0 c) 9 d) – 9

25. If $2\cos\theta = 1$ then the value of 'θ' is a) 30^o b) 45^o c) 60^o d) 90^o

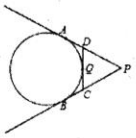
PART – II

Note: Answer ALL the questions : **25X2=50**

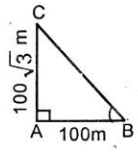
1. If A = {1,2,3,4,5} and B = {3,4,5,6} and C = {5,6,7,8} then show that $A \cup (B \cup C) = (A \cup B) \cup C$.
2. If A = {a,b,c,d,e}, B = {a,e,i,o,u} and C = {c,d,e,u} then prove that $A \setminus (B \setminus C) \neq (A \setminus B) \setminus C$.
3. If A = {x/–3 ≤x<4, x∈R}, B = {x/x<5,x∈N} and C = {–5,–3,–1,0,1,3} show that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
4. If A = {4,6,7,8,9}, B = {2,4,6} and C = {1,2,3,4,5,6} then find
   i) $A \cap (B \cup C)$ and ii) $A \setminus (C \setminus B)$
5. If n(A) = 20, n(B) = 30, $n(A \cup B) = 40$ then find $n(A \cap B)$
6. $\cup$ = {–2,–1,0,1,2,3, . . . , 10}, A = {–2,2,3,4,5}, B = {1,3,5,8,9} verify De Morgan's laws of complemention.
7. Verify $(A \cup B)' = A' \cap B'$ by Venn diagrams.
8. A = {0,1,2,3,4}, B = {1,–2,3,4,5,6} and C = {2,4,6,7}. Represent $A \cup (B \cap C)$ in Venn diagrams.
9. A = {4,6,8,10} and B = {3,4,5,6,7}. If $f:A \to B$ is defined by $f(x) = \frac{x}{2} + 1$, then represent it by arrow diagram.
10. A function $f:[1,6) \to R$ is defined as follows. $f(x) = \begin{cases} 1+x & 1 \le x < 2 \\ 2x-1 & 2 \le x < 4 \\ 3x^2 - 10 & 4 \le x < 6 \end{cases}$ then find $2f(5) - 3f(1)$.
11. In Δ ABC, DE is parallel to BC, meeting AB and AC at D and E. If AD = 3 cm, DB = 2 cm and AE = 2.7 cm, then find AC.
12. In the figure of Δ PQR, RS is the internal bisector of $\angle R$. If PQ = 6 cm, QR = 8 cm, RP = 4 cm then find PS.



13. If a vertical stick 12m long casts a shadow 8m long on the ground and at the same time a tower casts a shadow 40m long on the ground, then find the height of the tower.
14. AB and CD are two chords of a circle which when produced to meet at a point P such that AB = 5 cm, AP = 8 cm, and CD = 2 cm then find PD.
15. A point P is 26 cm away from the centre O of a circle and PT is the tangent drawn from P to the circle is 10 cm, then find OT.
16. In the figure, PA and PB are tangents to the circle drawn from an external point P. Also CD is a tangent to the circle at Q. If PA = 8 cm and CQ = 3 cm, then find PC.



17. A kite is flying with a string of length 200m. If the thread makes an angle 30^o with the ground, find the distance of the kite from the ground level.
18. A ladder leaning against a vertical wall, makes an angle of 60^o with the ground. The foot of the ladder is 3.5m away from the wall. Find the length of the ladder.
19. Find the angular elevation of the Sun when the length of the shadow of a 30m long pole is $10\sqrt{3}$ m.
20. Prove that $1 - \frac{\sin^2\theta}{1+\cos\theta} = \cos\theta$.
21. Show that $\cos^4 x - \sin^4 x = 2\cos^2 x - 1$.
22. Prove that $\frac{\sec\theta}{\cot\theta + \tan\theta} = \sin\theta$
23. In the adjoining figure find $\angle$ABC.



24. In the adjoining figure if $\sin\theta = \frac{15}{17}$. Then find BC.