BACHELOR OF COMPUTER APPLICATIONS (PRE REVISED)

03224

Term-End Examination

June, 2013

CS-60 : FOUNDATION COURSE IN MATHEMATICS IN COMPUTING

Time : 3 hours   *Maximum Marks : 75*

*Note :   Question **No. 1** is **compulsory**. Attempt **any three** questions from question **No. 2 to 6**. Use of calculator is **permitted**.*

For Q.No. 1 (a), 1 (b) and 1 (c) ;

For the set of real numbers R and binary operation of addition, i.e, ' + ', the binary operation of multiplication, i.e, '.', and binary relation greater than, i.e, '>', state the following properties :

1.   (a)   (i)   Addition is associative in R   3

(ii)   Multiplication is associative in R

(b)   (i)   Multiplication is associative in R   3

(ii)   Addition is commutative in R

(c)   (i)   Addition is monoton w.r.t '>'   3

(ii)   '>' is transitive in R

(d)   If $|x|$ denotes mod of x, then find value of   3
each of the following :

(i) $|37|$ (ii) $|-42|$ (iii) $|0|$

(e) Give an example of each of the following :　　3
   (i)　An onto function
   (ii)　Identity function
   (iii)　A constant function

(f) Compute the points of intersection of the　3
   parabola $y^2 = 4x$ and the straight line $x = 4$.

(g) Find the equation of a circle with centre the　3
   point $(2, 3)$ and radius 4 units.

(h) What is the slope of the line joining　3
   A $(-3, 5)$ and B $(4, 2)$?

(i) Prove that the straight lines $2x + 3y + 5 = 0$,　3
   and $3x - 2y + 19 = 0$ are perpendicular to
   each other.

(j) Find the equation of the straight line that　3
   passes through the points $(2, 7)$ and
   $(8, 5)$.

(k) Calculate the latus rectum of the ellipse　3
   whose equation $5x^2 + 9y^2 = 45$

(l) Prove that　　3

$$\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = abc\,(a-b)\,(b-c)\,(c-a)$$

(m) If $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$ then find the value of $|A| =$ the　3
   determinant of A.

(n) Evaluate dy/dx where $y = 3\cos x + 7$.　3

(o) Compute $\int 2x^2\,dx$　　3

2. (a) What is the equation of the tangent to the 3
circle $x^2 + y^2 = 16$ and parallel to the line
$y = x$?

(b) Compute the value of the determinant : 3

$$\begin{vmatrix} 1 & 0 & 0 \\ 2 & \cos x & \sin x \\ 3 & \sin x & \cos x \end{vmatrix}$$

(c) Find $\dfrac{dy}{dx}$, if $y = x.\sin x$ 4

3. (a) What is the coordinate of the point P which 3
divides the straight line AB, joining of
A $(5, -2)$ and B $(9, 6)$ in the ratio $3 : 1$?

(b) If $A + B = \begin{bmatrix} 1 & 2 \\ 5 & -6 \end{bmatrix}$, and $A - B = \begin{bmatrix} -3 & 4 \\ -1 & -2 \end{bmatrix}$, 3

then compute the matrices A and B.

(c) Find $\dfrac{dy}{dx}$ if $y = \tan^{-1} \left[\dfrac{\cos x - \sin x}{\cos x + \sin x} \right]$. 4

4. (a) Find out the radius of the circle 4
$x^2 - 4x + y^2 - 6x = 12$.

(b) Compute the area lying in the first 3
quadrant, bounded by the curve $y^2 = 9x$, the
lines $x = 1$, $x = 4$ and $y = 0$.

(c) Find the distance between the pair of points 3
$(1, 3)$ and $(2, 7)$.

5. (a) Find out the equation of a hyperbola whose   3
foci are at $(\pm 4, 0)$, and vertices at $(\pm 2, 0)$.

(b) Find out the area enclosed between the   3
curve $y^2 = 4x$ and the line $y = x$.

(c) The radius of a sphere is increased by 50%.   4
What is the increase in surface of the
sphere ?

6. (a) A tower as shown in figure 1 subtends an
angle of 30° at a point A, on the same level
as the foot of the tower, and at a second
point B, h metre above the first, the
depression of the foot of the tower is 60°.
Calculate the height of the tower. (OP is the
tower).   3+3+4

Figure 1
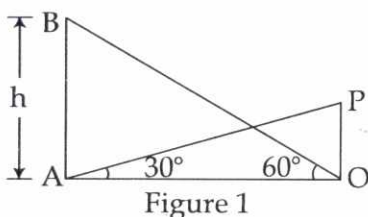
(b) What will be the sum of all the even
numbers between 1 and 60 ?

(c) A policeman is running after a thief who
has got a start of 200 m. If the policeman

runs $4\dfrac{1}{6}$ m/sec and the thief at $3\dfrac{1}{3}$ m/sec,

then when will the thief be caught ?

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