FYBCA, SEM I, SPECIAL SUPPLEMENTARY EXAMINATION, MAY/JUNE 2015

BASIC MATHEMATICS (BCA 104)

Duration: 2 hours   **Marks: 50**

Instruction: 1) *All questions are compulsory*
2) *Figures to the right indicate full marks*
3) *Start each new question on fresh page*
4) *Logarithmic tables will be provided if required.*

Q I. A) Fill in the blanks.   **(5 marks)**

i) If $A = \begin{bmatrix} 3 & -5 \\ 2 & 0 \end{bmatrix}$ then $A^{-1} =$ _____.

ii) $z = 1+i$ in the polar form is_____.

iii) The gcd (412 , 36) = _____.

iv) The distance between the points (0,2) and (2,-5) is _____.

v) If a line has slope 3 and y intercept 2 then its equation is _____.

B) Answer the following:

i) If A(-2,-1) and B(3,-2) represents the diameter of a circle. Find the co-ordinates of the circle.   **(1 mark)**

ii) Find the value of k, if the equation $2x^2+kx+3=0$ has repeated roots.   **(2 marks)**

iii) Find the fourth proportional of $\frac{1}{4}, \frac{1}{6}$ and $\frac{4}{5}$.   **(2 marks)**

Q II) Answer any 2 of the following: **(2 x 5 marks = 10 marks)**

i) Find the cube roots of unity.

ii) Find 4 numbers in arithmetic progression whose sum is 16 and the sum of their squares is 84.

iii) If the third term of a geometric progression is 50 and its sixth term is 6250, find the first term and the common ratio. Also find the sum of its first seven terms.

III) Answer any 2 of the following: **(2 x 5 marks = 10 marks)**

i) Prove that $\sin 2\theta = 2\sin\theta\cos\theta$

   and $\cos 2\theta = 2\cos^2\theta - 1$

ii) If $\log_3 x + 3\log_{27} x + 8\log_{81} x = 8$, find x.

iii) Find the equation of the line passing through the mid point of AB and the mid point of CD where A (-1.-5) , B(3,3) , C(2,-5) and D(-4,-1).

IV) Answer any 2 of the following: **(2 x 5 marks = 10 marks)**

i) Solve the following equations using Cramer's Rule, 3x+5y-4z=22 , 2x-3y+z=3   and

   −x+4y+6z=19.

ii) Find a , if the triangle formed by A(4,3) , B(6,-2) and C(a,-3) is right angled at A.

iii) Show that (3,5) ,(4,3) and (11,-4) are the vertices of an isosceles right angled triangle.

V) Answer any 2 of the following: **(2 x 5 marks = 10 marks)**

i) Solve the following using matrix method, 2x+8y+5z =5, x+y+z =-2   and
   x+2y-z=2.

ii) If $A = \begin{bmatrix} 2 & -1 \\ 3 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 5 & 7 \\ -3 & -2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 6 & 4 \\ 3 & 2 & 1 \end{bmatrix}$.

   Verify that a) A(B-C) = AB −AC

   b) A (BC) = (AB) C

iii) A rectangular piece of paper is 22cm long and 12 cm wide. A cylinder is formed by rolling the paper along its length. Find the volume of the cylinder.

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