BOARD OF INTERMEDIATE EDUCATION, A.P, HYDERABAD

MODEL QUESTION PAPER BRIDGE COURSE

MATHEMATICS, PAPER-I (W.E.F.2013-14)

Time: 3 Hours
Max.marks:75

Note: This Question Paper contains of two sections A and B.

SECTION-A **10** X **3 =30**

Note: (i) Short Answer Type Questions.
(ii) Attempt **All** Questions.
(iii) Each Question carries **Three** marks.

1. If $A=\begin{bmatrix}1 & 2 & 2\\ 2 & 1 & 2\\ 2 & 2 & 1\end{bmatrix}$ then show that $A^2-4A-5I=0$

2. If $\bar{a}=\bar{i}+2\bar{j}-3\bar{k}$ and $\bar{b}=3\bar{i}-\bar{j}+2\bar{k}$ then show that $\bar{a}+\bar{b}$ and $\bar{a}-\bar{b}$ are perpendicular to each other.

3. If the position vectors of the points A, B and C are $-2\bar{i}+\bar{j}-\bar{k}, -4\bar{i}+2\bar{j}+2\bar{k}$ and $6\bar{i}-3\bar{j}-13\bar{k}$ respectively and $\overline{AB}=\lambda\overline{AC}$, then find the value of λ.

4. If $\tan\theta=\frac{-4}{3}$ and 'θ' does not lie in 4th Quadrant. Prove that $5\sin\theta+10\cos\theta+9\sec\theta+16\operatorname{cosec}\theta+4\cot\theta=0.$

5. If $\cos\theta+\sin\theta=\sqrt{2}\cos\theta.$ Prove that $\cos\theta-\sin\theta=\sqrt{2}\sin\theta.$

6. Find the equation of the straight line perpendicular to the line $5x-3y+1=0$ and passing through the point $(4,-3)$.

7. If θ is the angle between the lines $\frac{x}{a}+\frac{y}{b}=1$ and $\frac{x}{b}+\frac{y}{a}=1$ find the value of sin θ when $a > b$.

8. Show that the points (5, 4, 2) (6, 2, –1) and (8, –2, –7) are collinear.

9. Evaluate $\underset{x\to 0}{Lt}\frac{3^x-1}{\sqrt{1+x}-1}$.

10. Find the derivative of $\log[\tan 5x]$ w.r.t x.

SECTION-B 3 X 15 = 45

Note: (i) Long Answer Type Questions.
(ii) Attempt any **Three** Questions.
(iii) Each Question carries **Fifteen** marks.

11. (a) Solve the following simultaneous linear equations by matrix inversion method, $3x+4y+5z=18, 2x-y+8z=13$ and $5x-2y+7z=20$. (8)

(b) If $\theta-\phi=\frac{\pi}{2}$, then show that

$$\begin{bmatrix} \cos^2\theta & \cos\theta\sin\theta \\ \cos\theta\sin\theta & \sin^2\theta \end{bmatrix}\begin{bmatrix} \cos^2\phi & \cos\phi\sin\phi \\ \cos\phi\sin\phi & \sin^2\phi \end{bmatrix}=0 \quad (7)$$

12. (a) If $\bar{a}, \bar{b}, \bar{c}$ are non coplanar vectors, then prove that the vectors $5\bar{a}+6\bar{b}+7\bar{c}$, $7\bar{a}-8\bar{b}+9\bar{c}$ and $3\bar{a}+20\bar{b}+5\bar{c}$ are coplanar. (8)

(b) If $\bar{a}=2\bar{i}+2\bar{j}-3\bar{k}$, $\bar{b}=3\bar{i}-\bar{j}+2\bar{k}$, then find the angle between $2\bar{a}+\bar{b}$ and $\bar{a}+2\bar{b}$. (7)

13. (a) If $A+B=45^o$, then prove that $(\cot A-1)(\cot B-1)=2$. Hence deduce $\cot 22\frac{1}{2}^0$. (8)

(b) If 2 tan A + cot A = tan B, prove that 2 tan (B – A) = cot A. (7)

14. (a) Find the orthocentre of the triangle whose vertices are (-5, -7), (13, 2) and (-5, 6). (8)

(b) Find the angles of the triangle whose sides are $x+y-4=0, 2x+y-6=0$ and $5x+3y-15=0$. (7)

15. (a) If $y=(\sin x)^x+x^{\sin x}$ find $\frac{dy}{dx}$. (8)

(b) Show that the curves $6x^2-5x+2y=0$ and $4x^2+8y^2=3$ touch each other at $\left(\frac{1}{2},\frac{1}{2}\right)$. (7)

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