February 2010

[KW 6001] **Sub. Code : 6001**

BACHELOR OF OPTOMETRY DEGREE EXAMINATION

First Year
Paper –I – Mathematics I and II

Q.P. Code : 806001

Time : Three hours **Maximum : 100 marks**

ANSWER ALL QUESTIONS

Draw diagrams wherever necessary

I. Essays: **(2x15=30)**

1. a) Prove that: If n and r are positive integers such that $r \le n$, then $nc_r + nc_{r-1} = (n+1)\, c_r$.

   b) State and prove Napier's formulae.

2. Solve $\frac{d^2y}{dx^2} - \frac{3dy}{dx} + 2y = 2e^{3x}$, when x=log2, y=0 and when x=0, y=0.

II. Short Notes : **(10x5=50)**

1. **R**esolve into partial fractions. $\frac{3x+7}{x^2-3x+2}$

2. Find the expansion of $(2x+3y)^5$.

3. Prove that $\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \frac{1+\sin\theta}{\cos\theta}$

4. State and prove the sine formulae.

5. If A+B=45º, show that (1+Tan A) (1+Tan B) = 2. and hence deduce the value of Tan 22½ º.

6. Find the length of the curve X=a, (t – sin t), Y=a (1-cos t) between t=0 and t = π.

7. If $A = \begin{pmatrix} 5 & 2 \\ 7 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -1 & 1 \end{pmatrix}$ then prove that $(AB)^{-1} = B^{-1} A^{-1}$

8. Prove that $[\vec{a} \times \vec{b}, \ \vec{b} \times \vec{c}, \ \vec{c} \times \vec{a}] = [\vec{a}, \ \vec{b}, \ \vec{c}]^2$

9. Solve the following equations x+2y+z=7, 2x-y+2z=4, x+y-zz=-1.

10. Write a short note on equilibrium of rigid bodies in two dimension.

III. Short Answers : (10x2=20)

1. If NP_4=360, find the value of N.

2. Write expansion of Binomial theorem.

3. Prove that $$\frac{\text{Tan } 69^{o} + \text{Tan } 66^{o}}{1 - \text{Tan } 69^{o} \text{ Tan } 66^{o}} = -1$$

4. Prove $\text{Sin}^{-1}(-x) = -\text{Sin}^{-1}x$.

5. Prove the derivative of a constant function is zero.

6. Determine $\frac{2y}{2x}, \frac{2y}{2y}, \frac{2^2y}{2x^2}$ and $\frac{2^2y}{2y^2}$ when $u(x, y) = x^4+y^3+3x^2y^2+3x^2y$.

7. Find the area of the region bounded by the line 3x-5y-15=0 x=1, x=4, and x axis.

8. $Y=x^3$, x=0, y=1 is resolved about the y- axis.

9. Define centre of gravity.

10. State the law of thermodynamics.

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August 2011

[KZ 0811] **Sub. Code: 6001**

B.Sc. OPTOMETRY
FIRST YEAR
PAPER I – MATHEMATICS I & II
***Q.P. Code :* 806001**

Time : Three hours **Maximum : 100 marks**

Answer All questions.

I. Elaborate on : **(3 X 10=30)**

1. If A+B=45º, show that (1+tan A) (1+tan B) = 2 and hence deduce the value of tan 22 1/2º.
2. State and prove the Sine formulae.
3. Prove the : If n and r are positive integers such that $r \leq n$, then $nc_r+nc_{r-1}=(n+1)c_r$.

II. Write notes on : **(8X 5 = 40)**

1. State and prove Napier's formula.
2. Define : Ellipse and prove that standard equation of the ellipse.
3. Differentiate $\frac{x2-1}{x2+1}$ with respect to x.
4. Find the equation of Hyperbola whose directri x is 2x+y=1, focus (1,2) and eccentricity √3.
5. Prove that : $\frac{\tan\ +\text{Sec}\ -1}{\tan\ -\text{Sec}\ +1} = \frac{1+\text{Sin}}{\text{Cos}}$
6. Solve : $(x^2-y)dx + (y^2-x)dy = 0$ if it passess through the origin.
7. Define : Principles of conservation of Momentum.
8. Find the equation of the tangent to the curve $y=x^2-x-2$ at the point (1, -2).

III. Short Answers on : **(10X 3 = 30)**

1. Find the principle value of $\text{Sec}^{-1}(2/\sqrt{3})$.
2. Prove that e^x is strictly increasing function on R.
3. Evaluate : $2\tan^{-1}x = \text{Sin}^{-1}(2x/1+x^2)$
4. Find $\frac{dy}{dx}$ for the following implicite function $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$.
5. Differentiate : Sin-1 $\frac{2x}{1+x^2}$
6. Which of the following functions are increasing or decreasing on the interval given? X^2-1 on (0,2).
7. Solve : $\frac{dy}{dx} = \frac{y}{x} + \tan\frac{y}{x}$
8. Find the equation of the Parabola if the vertex (0,0) and the focus is (-a,0) a>0.
9. Show that $\text{Cos}^4A-\text{Sin}^4A = 1-2\,\text{Sin}^2A$.
10. Prove that any triangle ABC Θ=1/2 ab Sin C.

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