# MATHEMATICS 2011

**Time: 2 ½ Hours** **Max. Marks: 80**

**Instruction:** **This paper consisting of Short-Answer Questions (Section "B") and Detailed-Answer Questions (Section "C") will be given after 30 minutes and its total duration will be 2 ½ hours only.**

## SECTION "B" (SHORT-ANSWER QUESTIONS)

**Note: Answer any 10 questions from this section.(50)**

2. If A = {1,2,3,4} and B = {2,4,6,8}, show that (A U B) – (A ∩ B) = A Δ B.

3. With the help of log table, find the value of $\frac{(6.735)(48.27)}{(16.18)^2}$

4. Find the value of $a^3 - \frac{1}{a^3}$ when $a - \frac{1}{a} = 4$

5. Resolve into factors: $x^2(y-z) + y^2(z-x) + z^2(x-y)$

6. Find the solution set of $x^2 + 8x + 15 = 0$ with the help of quadratic equation.



7. Simplify the following: $\left(\frac{x^{2a}}{x^{a\cdot b}}\right)\left(\frac{x^{2b}}{x^{b\cdot c}}\right)\left(\frac{x^{2c}}{x^{c\cdot a}}\right)$

8. For what value of 'q' , $4x^4 + 12x^3 + 25x^2 + 24x + q$ will be a perfect square.

9. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 0 \end{bmatrix}$; prove that $AA^{-1} = 1$

10. Find the relation independent of 'x' from the following equation: $x + \frac{1}{x} = 2a, x^3 + \frac{1}{x^3} = b^3$

11. If two angles of a triangle are congruent, the sides opposite to them are also congruent. Prove.

12. Find the solution set of the equation $\left|\frac{2x+5}{6}\right| - 3 = 1$

13. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, Prove that $(a^2 + c^2 + e^2)(b^2 + d^2 + f^2) = (ab + cd + ef)^2$

14. If a perpendicular is drawn from the centre to a chord of a circle, it bisects the chord. Prove.

15. Prove that $\sin^2\theta + \cos^2\theta = 1$.

16. Find the solution set of: $\sqrt{25y-6} = 4\sqrt{y+3}$

## SECTION 'C' (DETAILED – ANSWER QUESTIONS)

**NOTE: Attempt any 3 questions from this section. Including Q.no.19 which is compulsory. (30)**

17. Factorize the following:- (10)

(i) $18x^2 + 9x - 20$ (ii) $a^4 + 64$

(iii) $a^3 - a^2 + 2$ (iv) $27x^3 - 1 + 8y^6 + 18xy^2$

18. Find the solution set of the following equations graphically: (Find four ordered pairs for each equation.) $x - 2y = -3$, $2x + y = 14$

19. In any correspondence of two right-angles, if their hypotenuses are congruent and one more side of one triangle is congruent to the corresponding side of the other, the two triangles are congruent. Prove it. (10)

20.(a) The marks obtained by 84 students in an examination are given below. Find the mean: (05)

| Marks | 25 – 29 | 30 – 34 | 35 – 39 | 40 – 44 | 45 – 49 |
|---|---|---|---|---|---|
| Students | 9 | 18 | 35 | 17 | 5 |

(b) Factors with the help of remainder theorem. (05)

$x^3 + 3x^2 + 4x - 28$.

21. Take two points p & q at a distance of 7cm. Draw circles with the radii of 2.8cm, and 1.6cm with centres p & q. Draw direct common tangent to these circles & write steps of construction