XII-Mathematics

MOST Important Questions For 2017

FROM THE DESK OF: FAIZAN AHMED

	Exercise: 1.1	
Q.6	If $f: \mathbb{R} \to \mathbb{R}$, is given by: $f(x) = \begin{cases} 0, \text{when } x \in \mathbb{Q} \\ 1, when\ x \in \mathbb{R} - \mathbb{Q} \end{cases}$ (Q being the set of rational numbers) Find: (i) $f(\sqrt{2})$ (ii) $the\ range\ of\ f(x)$ (iii) $f\left(\frac{1}{5}\right)$ (iv) $f(2)$	2008,2007
	Exercise: 1.3	
	A sequence is given by: $\frac{1.3}{2.4}, \frac{3.5}{4.6}, \frac{5.7}{6.8}, \ldots$ Where ' . ' represents ordinary multiplication. Write down the General Term of the sequence and find it limit.	2013,2006,2002, 1997,1994,1992
	Exercise: 1.6	
Q.12	$\lim_{\theta \to 0} \frac{\text{cosec}\theta - \cot\theta}{\theta}$	2012,1997,
Q.17	$\lim_{\alpha \to 0} \frac{tan\alpha - sin\alpha}{sin^3\alpha}$	2011,2008,2006, 2005,2001,1999,
	Exercise: 1.7	
Q.6	$\lim_{x \to 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$	2007,
Q.7	$\lim_{x \to 0} \frac{e^{mx} - e^{nx}}{x}$	2013,2011,2008, 2004,
Q.15	$\lim_{x \to 0} \frac{tanx - sinx}{x}$	2014,2003,1996
	Exercise: 2.1	
Q.14 Long	The vertices A,B and C of a triangle are (2,1), (5,2) and (3,4) respectively. Find the coordinates of the circum-centre and radius of the circum-circle of the triangle ABC.	2012,1993, 1999,2004,2008
	Exercise: 2.2	
Q.19	The straight line joining the points (1, -2), (-3, 4) is trisected, find the coordinates of the points of trisection.	1998
Q.17	In what ratio does the point M(2,4) divide the join of L(7,9) and N(-1,1)?	2006
	Exercise: 2.4	
Q.10	If the line through (2, 5) and (–3, –2) is perpendicular to the line through (4, –1) and (x, 3), find x.	2014,2013,2010, 2004,1995,
Q.21 Long	Show that the line segment joining the mid-points of any two sides of a triangle is parallel to the third side and equal to one-half of its length.	2005
	Exercise: 2.5	
Q.9	Find the equation of the perpendicular bisector of the line segment joining the points A (15,14) and B (-3, -4).	2008
Q.20	Determine the equation of the line which passes through the point (-3, -4) sum of intercepts 1.	2013,2010
	Exercise: 3.1	
Q.14	Find the equation of a line through the intersection of the lines 2x+3y+1=0, 3x-4y-5=0 Passing through (2,1).	2014
Q.18	Determine the values of λ and μ for which the line	2008, 2003

	$(\lambda + 2\mu - 3)x + (2\lambda - \mu + 1)\, y + 6\,\lambda + 9 = 0$ **is parallel to the axis of X and has y – intercept -3 . Also write the equation of the line.**	
	Exercise: 3.2	
Q.2	**Find the distance between the parallel lines:** $5x - 12y + 10 = 0, 5x - 12y - 16 = 0$	**2014**
Q.7	**Find the value of k when the vertices of the triangle are the points (2,6), (6,3) and (4,k) whose area is 15 Square units.**	**2013**
Q.15 Long	**D, E, F are the mid-points of the sides BC, CA, AB respectively of the triangle ABC show that** $\Delta ABC = \Delta DEF$.	**2010,1997**
Q.11	**Find the co-ordinates of the foot of the perpendicular from (-2,5) to a line x+3y +11= 0.**	**2007,2015**
Q.18	**The area of a triangle is 8 square unit, two of its vertices are the points A(1,-2) and B(2,3) and third vertex lies on the line 2x+y-2=0. Find the co-ordinates of C.**	**2015**
	Exercise: 3.3	
Q.6	**The gradient of one of the lines of** $ax^2 + 2hxy + by^2 = 0$ **is five times the other, then show that:** $5h^2 = 8ab$	**2013,2010**
Q.7	**Find the centroid of the triangle, the equations of whose sides are** $12x^2 - 20xy + 7y^2 = 0$ **and** $2x - 3y + 4 = 0$.	**2005,2001,1997**
	Exercise: 4.1	
Q.1	**Find the derivative by the 1st principles at *x* = a in the domain D(f) of:** $f(x) = 3x^3 - x$ **2014** $f(x) = secx$	
	Exercise: 4.2	
	Find $\frac{dy}{dx}$ **in the following:** $y = \sqrt{\frac{1+x}{1-x}}$ $y = cot^{-1}\left(\frac{2x}{1-x^2}\right)$ $y = \frac{3x^2-1}{3x^2} + ln\sqrt{1+x^2} + tan^{-1}x$	
	Exercise: 4.3	
Q.8	$e^x lny = sin^{-1}y$	**2014,2010,2007, 2004,1997,1996**
Q.7	$\sqrt{x^2 + y^2} = ln(x^2 - y^2)$	**2014,1992,2008, 2003,2001,1999, 1993**
Q.5	$2x^2 + 3xy + 7y^2 - 2x + 4y + 9 = 0$	**2009,2002**
	Exercise: 4.4	
Q.3	$x = acos^2 3\theta$, y= $bsin^2 3\theta$	**2011,2007, 1993**
Q.6	$x = sint^3 + cost^3$ $y = sint + 2cos^{-1}t$	**2012,2008, 2006**
	Exercise: 5.2	
Q.2	**Using differentials, find the approximate value of:** $\tan 44^0$ **2008,2003** $\sin 46^0$ **2015**	
Q.4	**Show that** $\sqrt{x + \Delta x}$ **can be approximates as** $\sqrt{x} + \frac{1}{2\sqrt{x}}\Delta x$. **Hence find the value of**	**2014,2013,2011,**

	$\sqrt{3.9}$.				2006,2001,1992
	Exercise: 5.3				
Q.2 Long	$f(x) = x^3 - 9x^2 + 15x + 3$				2014,2009,2008, 2006,2002,1994
Q.11 Long	$f(x) = \frac{lnx}{x}$				2013,2010,2007
	Chapter 06				
	$\int cos^4 x dx$	$\int tan^3 x\, sec^3 x dx$	$\int \frac{x^2}{\sqrt{1-x^6}} dx$	$\int_0^{\frac{\pi}{4}} sin^2 x\, cos^2 x\, dx$	
	$\int \frac{2x-3}{x^2+2x+2} dx$	$\int x lnx\ dx$	$\int e^x \frac{1+sinx}{1+cosx} dx$	$\int \frac{2x dx}{\cos^2 2x}$	
	$\int 6x^5 e^{x^3} dx$	$\int \frac{cosx\, dx}{sinx(2+sinx)}$	$\int \frac{7x-25}{(x-3)(x-4)} dx$	$\int sin(lnx) dx$	
	Exercise: 6.10				
Q.14	$y = x - \frac{5}{x^2}, x = 2, x = 4$				2014
Q.5	$y = 3x^4 - 2x^3 + 1, x = 1$ and $x = 2$				2013,2011
	Exercise: 6.11				
	$2 + 2y\frac{dy}{dx} = 1 + 3x^2,\ y(2) = 1$				2014,2012
Q.22	$y\frac{dy}{dx} = x(y^4 + 2y^2 + 1), y(-3) = 1$				2010,2008,1999
	Exercise: 7.1				
Q.10	Find the equation of the circle which passes through the point (-2,-4) and concentric with the circle $x^2 + y^2 - 12y - 23 = 0$.				2004,
Q.11	Find the equation of the circle containing the points (-1,-1) and (3,1) and with the centre on the line $x - y + 10 = 0$.				2013,2011,2007, 2000,1997
	Exercise: 7.2				
Q.3	Prove that the curves $x^2+3y^2-24=0$ and $3x^2+y^2=12$ intersect at right angle at the point $(\sqrt{6}, \sqrt{6})$.				2011,1994,
Q.4 Long	Find the condition that conics $ax^2 + by^2 = 1$ and $a' x^2 + b' y^2 = 1$ cut each other orthogonally.				2014,
Q.20	Prove that two circles $x^2 + y^2 + 2gx + c = 0$ and $x^2 + y^2 + 2fy + c = 0$ touch each other if $\frac{1}{c} = \frac{1}{f^2} + \frac{1}{g^2}$.				2010,2009,2006, 2004,2001,2015
	Exercise: 8.1				
Q.5	Determine the vertex, focus, and directrix of the curve: $y^2 + 4y + 3x - 92 = 0$				2014
Q.6	Find the equation of the circle whose diameter is the latus rectum of the parabol $y^2 = -36x$.				2010,2004,2000, 2015
E.g#03 Pg#269	Find the equation of the parabola whose focus is (3, 4) and directrix $x + y - 1 = 0$.				2009,2007,2005,
	Exercise: 8.2				
Q.1	Find the eccentricity, centre, vertices and foci of the ellipse given by equation: $4x^2-16x+25y^2+200y+316=0$				2011
	Find the equation of ellipse whose centre is at (0,0) having $e = \frac{2}{3}$, latus rectum of length $\frac{20}{3}$ and major axis is along x-axis				2012,2009,2002
Q.3 Long	Find the equation of the circle passing through the focus of the parabola $x^2 + 8y = 0$ and foci of the ellipse $16x^2 + 25y^2 = 400$.				2015
Q.5 Long	Find the length of, and the equation to the focal radii draw to a point $(4\sqrt{3}, 4)$ of the ellipse $25x^2 + 16y^2 = 1600$.				2008

	Exercise: 8.3	
Q.1	**Find the equation of the hyperbola having focus $(8, 0)$ and directrix $x = 4$**	**2014,2013,1996**
	Exercise: 8.4	
Q.1 Long	**Prove that the line lx + my + n = 0 and the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ have just one point in common if $a^2l^2 + b^2m^2 - n^2 = 0$**	**2013,2005,1996, 1993**
Q.18	**If $y = \sqrt{5}x + k$ is a tangent to the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$. What is k?**	**2014,2000**
Q.30	**Show that the eccentricities e_1 and e_2 of the two conjugate hyperbolas satisfy the relation $e^2_1 + e^2_2 = e^2_1 e^2_2$**	**2014,2010,2009 2003,1999**
	Exercise: 9.3	
Q.10(iv)	**Find the scalars *x*, y and z such that:** $x(3\hat{i} - 4\hat{k}) + y(-\hat{i} + \hat{j} + 2\hat{k}) + z(\hat{i} - 4\hat{k}) = (5\hat{i} + 4\hat{j} - 10\hat{k})$	**2010**
E.g.#03 Page 335	**Resolve the vectors $\overline{a} = (-1, 8, -13)$ in the direction of the vectors $\overline{p_1} = (3, -2, 1), \overline{p_2} = (-1, 1, -2), \overline{p_3} = (-1, 1, -2)$**	**2004**
	Exercise: 9.5	
Q.9	**Find sin(a,b) and unit vector perpendicular to** $\overline{a} = \hat{i} + 2\hat{j} + 2\hat{k}$ **and** $\overline{b} = 3\hat{i} - 2\hat{j} - 4\hat{k}$	**2014,2009,2000**
	Exercise: 9.6	
Q.3	**Find the volume:** $\overline{a} = 2i + 3j + 4k, \overline{b} = i + 2j - k, \overline{c} = 3i - j + 2k$	**2013,2011,2004, 2002**
	Exercise: 9.7	
Q.5	**A particle is acted on by the constant forces $4\hat{i} + \hat{j} - 3\hat{k}$ and $3\hat{i} + \hat{j} - \hat{k}$ and is displaced from the point $\hat{i} + 2\hat{j} + 3\hat{k}$ to the point $5\hat{i} + 4\hat{j} + \hat{k}$; Find the work done by the forces on the particle.**	**2014,2012,2010, 2008,2007,2006, 2005,2003,2000, 1999,1996,2016**