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**HALF YEARLY EXAMINATION –NOVEMBER 2014**

**MODEL QUESTION PAPER**

**SUBJECT –MATHEMATICS**

**CLASS- XI**

**Time 3 Hours Max.Marks:100**

**General Instructions:**

**1. All Questions are compulsory.**

**2. Question Paper consist of 29 Questions.Setion A contains 10 questions, each carry 1 mark .Section B contains 12 questions each carry 4 marks .Section C contains 7**

 **questions each carry 6 marks.**

**3. There is no over all choice. However internal choice has been provided in few**

 **Questions.**

**SECTION – A (1 MARK EACH)**

1. **If U = { 1,2,3,4,5,6,7,8,9 } and A = {1,2,5,7} and B = { 6,7,8,9 } find (AUB)’?**
2. **Write the range of the relation {(x, x3): x is a prime number less than 6}.**
3. **If f(x) = 2x2 – 3x + 2, find f (-1) ?**
4. **Evaluate 2 sin2() + 2 cos2 () + 2 sec2().**
5. **Find the principal solution of cotx = - ?**
6. **Write  in a+ib form.**
7. **How many 5 letter codes can be formed using the first 10 letters of the English Alphabet, if no letter is repeated?**
8. **Find the solution of - 15** $\leq \frac{3(x-2)}{5}\leq 0$
9. **Find slope of the line 3x – 4y + 10 = 0?**
10. **Find the centre of the circle 3x2 +3y2 +12x – 15y + 8 = 0?**

**SECTION B (4 MARKS EACH)**

1. **Define modulus function. If f(x) =**$\left|x+2\right|$ **,find its domain and range?**
2. **Show that in any triangle ABC, (b-c)cot**$( \frac{A}{2} )$ **+(c-a)Cot(**$ \frac{B}{2} )$ **+ (a-b)cot(** $\frac{c}{2} ) $**= 0**
3. **Find the general solution of 2 cos2x + 3 sinx = 0?**
4. **Find the square root of the complex number Z = -15-8*i***
5. **If nP5 = 42 nP3 , n > 4 find the value of n?**

 **Or**

**Find the number of arrangements in the letters of the word MATHEMATICS. In how many of these arrangements**

1. **Do the words start with A?**
2. **Do all vowels occur together?**
3. **Prove that nCr + nCr-1 = n+1Cr .**

 **Or**

 **In an examination a question paper consist of 12 questions divided into two**

 **Parts, Part A and Part B containing 5 and 7 questions respectively. A student**

 **is required to attempt 8 question in all selecting at least 3 from each part.**

**In how many ways can a student select the questions?**

1. **Compute (102)4 using binomial theorem.**

 **Or**

 **Show that 9n+1 – 8n – 9 is divisible by 64, whenever n is a positive integer**

 **using Binomial expansion?**

1. **Find the middle term in the expansion of** ( 3x-)9

 **Or**

**Find the term independent of x in the expansion of (**

1. **Sum of the first p, q, and r terms of an A P are a,b,c respectively .Prove that **
2. **Find the sum of ‘n’terms of the series 12 + ( 12+22) + (12+22+32) + ……………**
3. **Find the equation of the line passing through the point of intersection of the lines 4x + 7y - 3 = 0 and 2x – 3y + 1 = 0 that has equal intercepts on the axis.**
4. **Find the equation of the altitude through the vertex A(2,2) of the triangle ABC,whose vertices are A(2,2),B(0,1) and C(3,-1)**

**PART C (6 MARKS EACH)**

1. **In In a survey of 123 people it was found that 23 smok,33 drink alcohol,78 eat junk food ,11 smoke and drink alcohol,12 drink alcohol and eat junk food ,13 eat junk food and smoke and 7 do all these.24 do not take any of these. Draw a Venn Diagram to illustrate the situation and find**
2. **How many only smoke**
3. **How many eat junk food but don’t drink alcohol.**
4. **Describe in your own words the ill effects of smoking, consuming alcohol and eating junk food.**
5. **Find the equation of the circle which passes through the points (2,3) , (-1,1) and whose centre lie on the line x - 3y - 11 = 0**
6. **Prove that** $ \frac{sin8x cosx-sin6xcos3x}{cos2xcosx-sin4xsin3x}=tan2x.$

 **Or**

 **Prove that cos2x + cos2(x +  ) + cos2(x - ) = **

1. **Prove by the Principal of Mathematical Induction that 32n+2 – 8n – 9 are divisible by 8.**

 **Or**

**Prove by the Principal of Mathematical Induction that**

** **

1. **Solve graphically, 2x + y 4, x + y  3, 2x – 3y  6.**
2. **Find the sum of n terms of the sequence 8, 88, 888, 8888………**
3. **Write the complex number Z =  in polar form after finding the modulus and amplitude. Also find** $\overbar{Z}$ **and Z-1 ?**

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