SECTION A

1. Four of the following five are alike in a certain way and so form a group. Which is the one that does not belong to that group?
1) Cricket   2) Football   3) Polo   4) Carrom   5) Hockey

2. In the word CONTRACTUAL, the positions of the first and the eleventh letters are interchanged. Similarly, the positions of the second and the tenth letters are interchanged, and so on, up to the positions of fifth and seventh letters are interchanged, keeping the position of sixth letter unchanged. Which letter will be the third to the right of the sixth letter from the left end?
1) U   2) N   3) T   4) A   5) None of these

3. In a certain code, LATE is written as $%#@ and WIDE is written as *?▲@. How is DIAL written in that code?
1) ▲@#$ 2) ▲@%$ 3) ▲?%$ 4) ▲?%#   5) None of these

4. What will come in place of the question mark (?) in the following series based on their positions in the English alphabet?
DGH JMN ? VYZ
1) PRS   2) QST   3) OQR   4) ORS   5) None of these

5. If in the following set of numbers, the first and the third digits are interchanged in each number, which number will be second if arranged in ascending order after interchanging the digits?
583 645 396 287 469
1) 583   2) 645   3) 396   4) 287   5) 469

6. There can be no arguing against a＿＿＿＿＿＿of mass public＿＿＿＿＿＿and distribution of medicines, as in the UK.
1) trend, awareness 2) notion, welfare
2) phenomenon, acceptance
3) system, procurement
4) backdrop, campaign

7. The government should＿＿＿＿＿with the industry about what would be a＿＿＿＿＿＿price for certain essential drugs.
1) negotiate, reasonable 2) deal, transparent 3) appeal, negotiable 4) raise, genuine 5) refrain, uniform

8. Malnourishment of Indian children is mostly due to traditional taboos＿＿＿＿＿＿with certain vital foods, and not due to their＿＿＿＿＿＿.

9. During his mandate, the secretary-general will face the＿＿＿＿＿challenge of＿＿＿＿＿a global agreement on climate change.
1) grave, drawing 2) pressing, forging 3) massive, framing 4) umpteen, sentencing 5) detrimental, inking

10. The key for today's UN is not to＿＿＿＿＿more goals, but to＿＿＿＿＿those that have been set before.
1) bargain, offload 2) address, justify 3) superseded, avail 4) amen, respond 5) create, implement

Directions (Q.11-18) : Read the following passage carefully and answer the questions given below it. Certain words are given in bold to help you locate them while answering some of the questions.

Farmers belonging to the Bharatiya Kishan Union have set fire to the trial plots of a Bt rice variety belonging to Mahyco that was being field-tested in Karnal. It turns out that the trial were being conducted in violation of biosafety standards. Farmers on whose fields the trials were being conducted had no idea what was planted, nor did they understand the implications of genetically-engineered (GE) rice containing the toxin gene from the bacterium Bacillus thuringiensis (BT)
Apart from the safety issue of eating genetically-engineered foods containing poison genes, there are other aspects that are particularly

relevant to GE rice and India. India is an exporter of both Basmati and non-Basmati rice and has significant trade interests in this crop. If Indian rice were to be contaminated with genetically-engineered Bt rice, which is certain to happen, traders would lose their traditional rice markets in the European Union, Africa and the Middle East. All these regions have declared their opposition to genetically-engineered foods. That is the reason why rice exporters have appealed to government to halt further trials of GE rice.

India shouldn't take the risk of cultivating GE rice not just from the trade point of view but also because it is a major centre of origin for rice. Mexico, which is the centre of origin and diversity for corn, has imposed a ban on not just the cultivation of GE corn, but also research in GE corn. Mexico has taken this position in order to safeguard the natural gene pool of corn, another major staple food of the world. India is one of the centres where rice originated. This means that the greatest number of rice and related genes are found in India.

Centres of origin are considered high-risk areas for GE crops because if foreign genes contained in the GE variety were to move into the natural gene pool, the results could be potentially catastrophic. Scientists promoting agbiotech argue that rice is a self-pollinating crop and will not accept outside pollen and genes. This is not true since cross -pollination is known to occur in rice and there are several studies that show that the extend of cross- pollination depending on humidity and wind speed, can in fact be significantly high. Studies conducted in China and Latin America have shown that gene flow between GE rice and other rice happens at rates that are high enough to cause concern about gene transfer.

One of the growing concerns about the impact of genetic engineering is gene-silencing. Experimental show that the introduction of foreign genes can cause gene-silencing in the plant that is receiving the foreign gene. This means certain genes in the plant will become silent (non- functional) and not produce what they normally should. Gene-silencing could have very grave implication if it were to spread to the natural gene pool by careless scientists.

Maintaining genetic diversity is crucial for the long-term survival of any crop. When a crop variety somewhere becomes vulnerable either due to the onslaught of a disease or the soil becoming waterlogged or alkaline, scientists need to breed another variety of the crop for that region. They do this by searching for suitable genes in related varieties and the natural gene pool of rice and introduce harmful features like gene-silencing or change the normal functions of other genes, it would have terrible implications for food security of the rice-eating regions of the world.

Although genetically-engineered crops and foods are being pushed into the market, there is little investment in their regulation and monitoring. Apart from that, not enough is understood about what happens when foreign genes are abruptly pushed into the genetic material of plants and animals. That is the reason why the biosafety process places such a premium on the precautionary principle. Essentially this says that when faced with uncertainty, it is better to be cautious and not proceed with genetic engineering.

11. What was the role of the farmers who gave their lands for field testing of Bt rice in Karnal?
1) They gave their lands for the testing against heavy rental. 2) They were in support of such a high-yield variety of the crop. 3) They were ignorant the consequence of such a trial. 4) They were in search of some experimentation in rice production. 5) None of these

12. What keeps India in a commanding position in rice export to various foreign countries?
1) Indian varieties of rice are considered to be in natural and pure form. 2) India has cheaper varieties of rice compared to other countries. 3) India has surplus rice production every year. 4) India has gained numero uno position in terms of quality and variety of rice. 5) None of these

13. What could be a major consequence if cultivation of GE rice is allowed in India?
1) It will give the foreign countries an easy entry into our agriculture sector. 2) It will open the path for research and experimentation in the field of agriculture. 3) It will increase the profit margins of our farmers. 4) It will make our country depending on foreign technology. 5) None of these

14. What should we do to maintain the natural gene pool of rice in our country?
1) We should not open our agriculture sector to the forces of globalization. 2) We should protect it from being mixed with other breeds and genes.
3) We should revise our policy of export of food grains. 4) We should complete with the genetically-engineered rice produced in foreign countries.
5) None of these

15. Which of the following seems to be 'true' in the context of the passage?
1) Mexico has banned the cultivation of GE rice. 2) India has maintained its natural gene pool of corn so far. 3) GE rice has made its firm ground in our country. 4) GE crops can pose health hazards to mankind. 5) None of these

16. Which of the following seems to be 'false' in the context of the passage?
1) Cross-pollination is not possible in the case of rice. 2) Mexico has taken measures against GE corn. 3) Introduction of GE rice is

facing resistance in our country. 4) GE crops are unsafe for human consumption. 5) None of these

17. What do you mean by gene-silencing in a crop?
1) Gene silencing in a crop is a technique in which different varieties of a crop grown together. 2) Gene silencing is a scientific term which is applied to boost the yield of a crop. 3) In gene silencing method the application of foreign gene to any variety of crop increase its yield. 4) The introduction of alien gene to a crop makes its natural gene dysfunct. 5) None of these

18. What message is given in this passage?
1) Save agriculture from the onslaught of globalization 2) Protect the original variety of rice 3) Ban the import of foreign food grains 4) Say no to scientific experiment in agriculture 5) None of these

19. Which of the following statements is not correct?
A. $\log_{10} 10 = 1$
B. $\log (2 + 3) = \log (2 \times 3)$
C. $\log_{10} 1 = 0$
D. $\log (1 + 2 + 3) = \log 1 + \log 2 + \log 3$

20. Find the greatest number that will divide 43, 91 and 183 so as to leave the same remainder in each case.
A.4   B.7   C.9   D.13

21. The least perfect square, which is divisible by each of 21, 36 and 66 is:
A.   213444   B.   214344   C. 214434   D.231444

22. 3 pumps, working 8 hours a day, can empty a tank in 2 days. How many hours a day must 4 pumps work to empty the tank in 1 day

A.9   B.10   C.11   D.12

23. A man buys Rs. 20 shares paying 9% dividend. The man wants to have an interest of 12% on his money. The market value of each share is:
A.Rs. 12 B.Rs. 15 C.Rs. 18 D.Rs. 21

24. Find the odd man out.
3, 5, 11, 14, 17, 21
A.21   B.17   C.14   D.3

25. Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is:
A.2 : 5   B. 3 : 5   C.4 : 5 D.6 : 7

<u>**SECTION B**</u>

26. Select which of the following is a correct description of SAX.

A. An interface handling XML documents via a tree structure
B. An interface processing XML documents using events
C. One of the schema definition languages that defines XML document structure
D. A specification for coding a method that selects a specific node from an XML document tree structure

27. Select which of the following is a valid XML document.

A.
```
<?xml version="1.0"?>
<!DOCTYPE rtelmnt[
<!ELEMENT rtelmnt (elmnt1,elmnt2?)+>
<!ELEMENT elmnt1 (#PCDATA)>
<!ELEMENT elmnt2 (#PCDATA)>
]>

<rtelmnt>
  <elmnt1></elmnt1>
  <elmnt2></elmnt2>
  <elmnt1></elmnt1>
  <elmnt2></elmnt2>
</rtelmnt>
```

B.
```
<?xml version="1.0"?>
<!DOCTYPE rtelmnt[
<!ELEMENT rtelmnt (elmnt1,elmnt2?)+>
<!ELEMENT elmnt1 (#PCDATA)>
<!ELEMENT elmnt2 (#PCDATA)>
]>

<rtelmnt>
</rtelmnt>
```

C.
```
<?xml version="1.0"?>
<!DOCTYPE rtelmnt[
<!ELEMENT rtelmnt (elmnt1*,elmnt2)?>
<!ELEMENT elmnt1 (#PCDATA)>
```

```
<!ELEMENT elmnt2 (#PCDATA)>
]>

<rtelmnt>
  <elmnt1></elmnt1>
  <elmnt2></elmnt2>
  <elmnt1></elmnt1>
  <elmnt2></elmnt2>
</rtelmnt>
```

D.
```
<?xml version="1.0"?>
<!DOCTYPE rtelmnt[
<!ELEMENT rtelmnt (elmnt1*,elmnt2)?>
<!ELEMENT elmnt1 (#PCDATA)>
<!ELEMENT elmnt2 (#PCDATA)>
]>

<rtelmnt>
</rtelmnt>
```

28. Select which of the following is a DTD definition that best fulfills the following conditions.

Information for a multiple number of products coded within in one XML document. Character data can be coded for product names (element name: product). The product number must have a single, unique name (attribute name: partsno), and is verified as singular and unique by the XML parser. Characters such as # and @ must not be used in price information (attribute name: price) The default value for price (attribute name: price) is "open". The "product" element must have a defined "partsno" attribute.

A.
```
<!ELEMENT pdata (product)>
<!ELEMENT product (#PCDATA)>
<!ATTLIST product partsno ID #IMPLIED>
<!ATTLIST product price CDATA "open">
```

B.
```
<!ELEMENT pdata (product)*>
<!ELEMENT product (#PCDATA)>
<!ATTLIST product partsno ID #IMPLIED>
<!ATTLIST product price CDATA "open">
```

C.
```
<!ELEMENT pdata (product)>
<!ELEMENT product (#PCDATA)>
<!ATTLIST product partsno ID #REQUIRED>
<!ATTLIST product price NMTOKEN "open">
```

D.
```
<!ELEMENT pdata (product)*>
<!ELEMENT product (#PCDATA)>
<!ATTLIST product partsno ID #REQUIRED>
<!ATTLIST product price NMTOKEN "open">
```

29. Select which of the following incorrectly describes the structure defined by the following XML Schema.

[XML Schema]
```
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
 <xs:element name="ProductItem" type="ProductType" />
 <xs:complexType name="ProductType">
  <xs:sequence minOccurs="0" maxOccurs="unbounded">
   <xs:element ref="ProductCode" />
   <xs:element ref="ProductName" />
   <xs:element ref="ProductQuantity" />
   <xs:choice>
    <xs:element name="ProductPrice01" type="xs:string" />
    <xs:element name="ProductPrice02" type="xs:unsignedInt" />
   </xs:choice>
  </xs:sequence>
  <xs:attribute name="LotCode" type="xs:string" use="required"/>
 </xs:complexType>
 <xs:element name="ProductCode" type="xs:string" />
 <xs:element name="ProductName" type="xs:string" />
 <xs:element name="ProductQuantity" type="xs:unsignedInt" />
</xs:schema>
```

A. The "ProductItem" element must include a "LotCode" attribute
B. The "ProductCode" element has no limitations as to the number of appearances
C. The order of appearance of the "ProductItem" element child element is random
D. Either the "ProductPrice01" element or the "ProductPrice02" element can be coded

30. Select which of the following correctly describes the location path for (1) in the XSLT stylesheet "b.xsl" created as output results from the XML document "a.xml" below.

[a.xml]
```
----------------------------
<?xml version="1.0"?>
<Exam>
 <Title>XML_Master_Exam</Title>
 <Information>
  <ExamName ExamNumber="I10-001">XML Master:Basic </ExamName>
  <ExamTime>60_Minutes</ExamTime>
  <Questions>50</Questions>
  <MinimumPass>at_least_70% correct</MinimumPass>
 </Information>
 <Information>
  <ExamName ExamNumber="I10-002">XML Master:Professional</ExamName>
  <ExamTime>90_Minutes</ExamTime>
  <Questions>40</Questions>
  <MinimumPass>at_least_80% correct</MinimumPass>
 </Information>
</Exam>
----------------------------
```

Output results
```
----------------------------
<test_info>
```

```
  <test_no>I10-001</test_no>
  <test_no>I10-002</test_no>
</test_info>
---------------------------


[b.xsl]
---------------------------
<?xml version="1.0"?>
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
  <xsl:template match="/">
    <test_info>
      <xsl:apply-templates select="//MinimumPass"/>
    </test_info>
  </xsl:template>

  <xsl:template match="MinimumPass">
   <test_no>
     <xsl:value-of select="(1)"/>
   </test_no>
  </xsl:template>
</xsl:stylesheet>
---------------------------
```

A. /Exam/Information/ExamName[@ExamNumber]
B. /Exam/Information/ExamName/@ExamNumber
C. ../ExamName[@ExamNumber]
D. ../ExamName/@ExamNumber

31. Which of the following DOM (Level 2) nodes is not a child node of an element node (Element) in DOM trees?

A. Element **B.** Entity **C.** EntityReference **D.** Text

32. When processing the following "XML Document" according to the method shown by "SAX Processing," which of the following correctly describes the output results (print method output)?

```
[XML Document]
<!DOCTYPE doc [
<!ELEMENT doc (#PCDATA | content)*>
<!ELEMENT content (#PCDATA)>
<!ENTITY title "&option;Wine Brand">
<!ENTITY option "Red ">
]>
<doc><content>The Title is "&title;"</content></doc>


[SAX Processing]
Use the following "ContentHandlerImpl" class, and parse the XML Document using SAX.
The SAX parser is a non-validating parser.
Assume no execution errors.

class ContentHandlerImpl extends DefaultHandler {
  public void characters(char[] ch, int start, int length) throws SAXException {
    System.out.print( new String(ch, start, length) );
  }
}
```

A. The Title is ""
B. The Title is "&option;Wine Brand"
C. The Title is "Red Wine Brand"
D. The Title is "&title;"

33. Push the Exhibit Button to load the referenced "XSLT Style Sheet". Perform XSLT transformation on the following "XML Document" using the "XSLT Style Sheet".

Select which of the following correctly describes what should be written in "XSLT Style Sheet" document (1) in order to output "234" as the result.
Note that the XSLT processor can output transformation results as a document.

[XML Document]

```
<dummy/>
```

[XSLT Style Sheet]

```
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xsl:output method="text" />
  <xsl:template match="/">
   <xsl:call-template name="COUNT">
     <xsl:with-param name="NUM" select="2" />
   </xsl:call-template>
  </xsl:template>


  <xsl:template name="COUNT">
   <xsl:param name="NUM" select="0" />
     --------(1)--------
  </xsl:template>
</xsl:stylesheet>
```

A.
```
<xsl:choose>
 <xsl:when test="$NUM &lt; 5">
   <xsl:value-of select="$NUM" />
   <xsl:call-template name="COUNT">
     <xsl:with-param name="NUM" select="$NUM+1" />
   </xsl:call-template>
 </xsl:when>
</xsl:choose>
```

B.
```
 <xsl:when test="$NUM &lt; 5">
   <xsl:value-of select="$NUM" />
   <xsl:call-template name="COUNT">
     <xsl:with-param name="NUM" select="$NUM+1" />
   </xsl:call-template>
 </xsl:when>
```

C.
```
<xsl:choose>
 <xsl:when test="$NUM &lt; 5">
   <xsl:value-of select="$NUM" />
   <xsl:param name="NUM" select="$NUM+1" />
```

```
  </xsl:when>
</xsl:choose>
```

D.
```
<xsl:when test="$NUM &lt; 5">
  <xsl:value-of select="$NUM" />
  <xsl:param name="NUM" select="$NUM+1" />
</xsl:when>
```

34. You wish to execute an XQuery on the following [example.xml] to obtain [Output Result]. Select the correct XQuery to obtain [Output Result]. Assume that the code attribute value of the log element noted in [example.xml] matches the code attribute value of the list element. Select any 1 option.

```
[example.xml]
<logList>
  <list code="w001" message="Warning1"/>
  <list code="w002" message="Warning2"/>
  <list code="e001" message="Error1"/>
  <list code="e002" message="Error2"/>
  <day date="2007-12-01">
    <log time="10:00:00" code="w001"/>
    <log time="14:00:00" code="e001"/>
  </day>
  <day date="2007-12-02">
    <log time="13:00:00" code="e002"/>
    <log time="15:00:00" code="e001"/>
  </day>
</logList>
```

```
[Output Result]
<result>
  <log date="2007-12-01" time="10:00:00" message="Warning1"/>
  <log date="2007-12-01" time="14:00:00" message="Error1"/>
  <log date="2007-12-02" time="13:00:00" message="Error2"/>
  <log date="2007-12-02" time="15:00:00" message="Error1"/>
</result>
```

A.
```
<result>{
  let $doc := fn:doc("example.xml")
  for $log in $doc//log
  return
    <log>{
      $log/../@date,
      $log/@time,
      $doc//list[@code eq $log/@code]/@message
    }</log>
}</result>
```

B.
```
<result>{
  let $doc := fn:doc("example.xml")
  for $log in $doc//log
  return
    <log>{
```

```
      ../@date,
      @time,
      ../../list[@code = $log/@code]/@message
    }</log>
}</result>
```

C.
```
<result>{
  let $doc := fn:doc("example.xml")
  for $day in $doc//day
  return
    <log>{
      $day/@date,
      $day/log/@time,
      $doc//list[@code eq $day/log/@code]/@message
    }</log>
}</result>
```

D.
```
<result>{
  let $doc := fn:doc("example.xml")
  for $day in $doc//day
  return
    <log>{
      @date,
      log/@time,
      ../list[@code = $day/log/@code]/@message
    }</log>
}</result>
```

35. A certain XMLDB can store an XML document as a model based on XML Information Set (Infoset), and retrieve the stored XML data via XQuery. Select two of the following statements that incorrectly explain the results of storing [example.xml] in an XMLDB, and then retrieving the XML data from the XMLDB. This question takes into account ignorable white space such as line feeds or indents in the XML document.

```
[example.xml]
<content lang="English"
    category="literature
       classic">silence<space> </space>...
silence</content>
```

A. When the content element is retrieved via XQuery, the category attribute is always first in order before the lang attribute.

B. When the content element is retrieved via XQuery, a line feed within the category attribute value is converted to a space (#x20) character.

C. The execution result of XQuery "fn:string(fn:doc('example.xml')/content)" is the following:
(assume that the XML data in the XMLDB can be referenced with "fn:doc('example.xml')")
silence ...
silence

D. The execution result of XQuery "fn:doc('example.xml')/content//text()" is the following:
(assume that the XML data in the XMLDB can be referenced with "fn:doc('example.xml')")
silence ...silence

36. Rearrange the following letters to make a word and choose the category in which it fits.
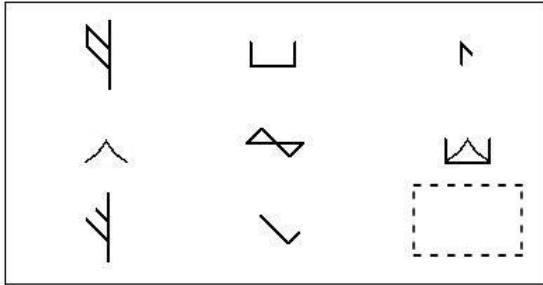RAPETEKA

A. city   B. fruit C. bird D. vegetable

37. Which number should come next in this series?
25,24,22,19,15

A.3   B.9   C.76   D.33   E.10

38. Pick the piece that's missing from the diagram below

39. Which number should come next in the series
1, 3, 6, 10, 15,
A. 8   B. 11   C. 24   D. 21   E. 27

40. A focus of an ellipse is at the origin. The directrix is the line x = 4 and the eccentricity is 1/2. Then the length of the semi–major axis is
(a) 4/3 **(b)** 8/3 **(c)** 7/3 **(d)** 5/3

41. A parabola has the origin as its focus and the line x = 2 as the directrix. Then the vertex of the parabola is at
(a) (0, 2)   **(b)** (0, 1)   **(c)** (1, 0)   **(d)** (2, 0)

42. The line passing through the points (5, 1, a) and (3, b, 1) crosses the yz–plane at the point (0, 17/2, -13/2) Then
(a) a = 2, b = 8 (b) a = 4, b = 6 (c) a = 6, b = 4 (d) a = 8, b = 2

43. How many real solutions does the equation $x^7 + 14x^5 + 16x^3 + 30x - 560 = 0$ have?
(a) 1   (b) 4   (c) 7   (d) 5

44. The area of the plane region bounded by the curves $x + 2y^2 = 0$ and $x + 3y^2 = 1$ is equal to (y^2 = y square)
(a) 3/5 (b) 4/3 (c) 7/3 (d) 1

45. The real number x when added to its inverse gives the minimum value of the sum at x equal to
(a) 2   (b) 1   (c) – 1 (d) –2