

# 14P/203/31(i)

(To be filled up by the candidate by blue/black ball-point pen)

Roll No. 

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Roll No. (Write the digits in words) .....

Serial No. of OMR Answer Sheet .....

Day and Date ..... (Signature of Invigilator)

## INSTRUCTIONS TO CANDIDATES

(Use only blue/black ball-point pen in the space above and on both sides of the Answer Sheet)

1. Within 10 minutes of the issue of the Question Booklet, check the Question Booklet to ensure that it contains all the pages in correct sequence and that no page/question is missing. In case of faulty Question Booklet bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.
2. Do not bring any loose paper, written or blank, inside the Examination Hall *except the Admit Card without its envelope.*
3. *A separate Answer Sheet is given. It should not be folded or mutilated. A second Answer Sheet shall not be provided. Only the Answer Sheet will be evaluated.*
4. Write your Roll Number and Serial Number of the Answer Sheet by pen in the space provided above.
5. *On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.*
6. *No overwriting is allowed in the entries of Roll No., Question Booklet no. and Set no. (if any) on OMR sheet and Roll No. and OMR sheet no. on the Question Booklet.*
7. *Any change in the aforesaid entries is to be verified by the Invigilator, otherwise it will be taken as unfair means.*
8. *Each question in this Booklet is followed by four alternative answers. For each question, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet.*
9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.
10. *Note that the answer once filled in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero marks).*
11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.
12. Deposit only OMR Answer Sheet at the end of the Test.
13. You are not permitted to leave the Examination Hall until the end of the Test.
14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

Total No. of Printed Pages : 32

[उपर्युक्त निर्देश हिन्दी में अन्तिम आवरण पृष्ठ पर दिये गए हैं।]

14P/203/31(I)

ROUGH WORK  
रुख कार्य

**14P/203/31(i)**

**No. of Questions : 150**

**प्रश्नों की संख्या : 150**

**Time :  $2\frac{1}{2}$  Hours**

**Full Marks : 450**

**समय :  $2\frac{1}{2}$  घण्टे**

**पूर्णाङ्क : 450**

**Note :** (1) Attempt as many questions as you can. Each question carries 3 (Three) marks. **One mark will be deducted for each incorrect answer. Zero mark will be awarded for each unattempted question.**

अधिकाधिक प्रश्नों को हल करने का प्रयत्न करें। प्रत्येक प्रश्न 3 (तीन) अंकों का है। प्रत्येक गलत उत्तर के लिए एक अंक काटा जायेगा। प्रत्येक अनुत्तरित प्रश्न का प्राप्तांक शून्य होगा।

(2) If more than one alternative answers seem to be approximate to the correct answer, choose the closest one.  
यदि एकाधिक वैकल्पिक उत्तर सही उत्तर के निकट प्रतीत हों, तो निकटतम सही उत्तर दें।

**01.** Let  $f(x) = |x|$  and  $g(x) = |x^3|$ , then at  $x = 0$  :

- (1)  $f(x)$  and  $g(x)$  are both continuous
- (2)  $f(x)$  and  $g(x)$  are both differentiable
- (3)  $f(x)$  is differentiable but  $g(x)$  is not differentiable
- (4)  $f(x)$  is not continuous but  $g(x)$  is continuous

02.  $\lim_{x \rightarrow 1} \frac{x + x^2 + \dots + x^n - n}{x - 1}$  is :

- (1) 0                      (2) n                      (3)  $\frac{n(n-1)}{2}$                       (4)  $\frac{n(n+1)}{2}$

03. The value of the derivative of  $|x - 1| + |x - 3|$  at  $x = 2$  is :

- (1) cannot be found                      (2) -2  
(3) 0                      (4) 2

04. If  $x^m y^n = (x + y)^{m+n}$ , then  $\frac{dy}{dx}$  is equal to :

- (1)  $\frac{y}{x}$                       (2)  $\frac{py}{qx}$                       (3)  $\frac{qy}{px}$                       (4)  $\frac{x}{y}$

05. If  $3^x + 3^y = 3^{x+y}$ , then the value of  $\frac{dy}{dx}$  at  $x = 1, y = 1$  is :

- (1) -1                      (2) 0                      (3) 1                      (4) 3

06. If  $\begin{vmatrix} a & b & 0 \\ 0 & a & b \\ b & a & 0 \end{vmatrix} = 0$ , then :

- (1)  $a = b = -1$                       (2)  $a = b = 1$   
(3)  $\frac{a}{b}$  is a cube root of unity                      (4)  $\frac{a}{b}$  is a cube root of -1

07. If  $\alpha, \beta, \gamma$  are the roots of the equation  $x^3 + px + q = 0$  (with  $p \neq 0, q \neq 0$ ), then the value of the determinant :

$$\begin{vmatrix} \alpha & \beta & \gamma \\ \beta & \gamma & \alpha \\ \gamma & \alpha & \beta \end{vmatrix} \text{ is :}$$

- (1) 0                      (2) p                      (3) q                      (4)  $p^2 - 2q$

08. In the expansion of  $\left(x^3 - \frac{1}{x^2}\right)^{15}$ , the term independent of  $x$  is :

- (1)  $-{}^{15}C_9$                       (2) 0                      (3) 1                      (4)  ${}^{15}C_9$

09. If the coefficients of the middle term in the expansion of  $(1 + x)^{2n+2}$  is  $p$  and the coefficient of middle terms in the expansion of  $(1 + x)^{2n+1}$  are  $q$  and  $r$ , then :

- (1)  $p = q + r$                       (2)  $q = p + r$   
 (3)  $r = p + q$                       (4)  $2p = q + r$

10. Arithmetic Mean of 10 consecutive natural numbers is 'M', then the Arithmetic Mean of the next 10 consecutive natural numbers is :

- (1) can not be found                      (2) M  
 (3)  $M + 5$                       (4)  $M + 10$

11. If  $G_1, G_2$  are the geometric means of two series of observations and  $G$  is the geometric mean of the ratios the corresponding observations, then  $G$  is equal to :

- (1)  $\frac{G_1}{G_2}$                       (2)  $\log G_1 - \log G_2$   
 (3)  $\frac{\log G_1}{\log G_2}$                       (4)  $\log \frac{G_1}{G_2}$

12. For fitting a polynomial of  $K^{\text{th}}$  - degree, there should be :
- (1)  $K$  Normal equations in  $K$  unknowns
  - (2)  $K$  Normal equations in  $(K+1)$  unknowns
  - (3)  $K + 1$  Normal equations in  $(K+1)$  unknowns
  - (4)  $K + 1$  Normal equations in  $K$  unknowns
13. In an experiment, a coin is tossed twice. If the second toss results in a head, a die is rolled. The number of elements in the sample space is :
- (1) 9
  - (2) 12
  - (3) 14
  - (4) 16
14. For two events  $A, B$  associated with a random experiment,  $B \subset A$ , then  $P(A \cap \bar{B})$  is equal to :
- (1)  $P(A) - P(B)$
  - (2)  $P(A) - 1 + P(B)$
  - (3)  $P(A) + 1 - P(B)$
  - (4)  $P(A) - 1 - P(B)$
15. Which of the following statements is correct ?
- (1) Every LPP admits an optimal solution.
  - (2) Every LPP admits a unique optimal solution.
  - (3) Every LPP admits an infinite number of optimal solutions.
  - (4) If a LPP admits two optimal solutions, it has an infinite number of optimal solutions.
16. Consider the following statements :
- A : The set of all feasible solutions of a LPP is called the feasible region.
- B : The set of all feasible solutions is a convex set.
- In your opinion :
- (1) Only A is correct
  - (2) Only B is correct
  - (3) Both A and B are correct
  - (4) Both A and B are incorrect

17. If A and B are two sets, then  $A \cap (A \cap B)$  equals :

- (1)  $\phi$                       (2) A                      (3) B                      (4)  $A \cap B$

18. A set contains n elements. The power set contains :

- (1) n elements                      (2)  $n^2$  elements  
(3)  $2^n$  elements                      (4)  $n^n$  elements

19. In an examination, 60% candidates passed in Physics, 75% passed in Mathematics. If x % passed in both, then :

- (1)  $15 \leq x \leq 60$                       (2)  $15 \leq x \leq 75$   
(3)  $35 \leq x \leq 75$                       (4)  $35 \leq x \leq 60$

20. If  $A = \{1, 2, 3\}$ ,  $B = \{2, 3, 4\}$  and  $C = \{2, 4\}$ , then the number of elements in  $(A - B) \times (B - C)$  is :

- (1) 1                      (2) 2                      (3) 3                      (4) 4

21. The value of  $\frac{1 - \tan^2 15^\circ}{1 + \tan^2 15^\circ}$  is :

- (1)  $\frac{\sqrt{3}}{2}$                       (2) 1                      (3)  $\sqrt{3}$                       (4) 2

22. The value of  $|\sin x + \cos x|$  is :

- (1)  $\leq \frac{1}{\sqrt{2}}$                       (2)  $\leq \sqrt{2}$                       (3)  $\leq 2$                       (4)  $\geq \sqrt{2}$

23. In a triangle ABC,  $a = 5$ ,  $b = 4$ ,  $\angle A = 60^\circ$ , then c is the root of the equation :

- (1)  $c^2 + 4c + 9 = 0$                       (2)  $c^2 + 4c - 9 = 0$   
(3)  $c^2 - 4c - 9 = 0$                       (4)  $c^2 - 4c + 9 = 0$

24. If the angles of a triangle are in the ratio 3:2:1, the corresponding sides are in the ratio :

- (1) 1 : 2 : 3      (2)  $1 : \frac{1}{2} : \sqrt{3}$       (3)  $2 : \sqrt{3} : 1$       (4) 3 : 2 : 1

25. In a triangle ABC,  $\frac{b+c}{8} = \frac{c+a}{9} = \frac{a+b}{7}$ , then the value of  $\cos c$  is :

- (1) 0      (2)  $\frac{3}{5}$       (3)  $\frac{4}{5}$       (4) 1

26. The least possible value of  $n$  for which  $\left(\frac{1-i}{1+i}\right)^n$  is real is :

- (1) 1      (2) 2      (3) 3      (4) 4

27. If  $w$  is the cube root of unity, then  $w, w^2$  are the roots of :

- (1)  $z^2 + z + 1 = 0$       (2)  $z^2 - z + 1 = 0$   
 (3)  $z^2 - z - 1 = 0$       (4)  $z^2 + z - 1 = 0$

28. If  $z + z^{-1} + 1 = 0$ , then  $z^{200} + z^{-200}$  is equal to :

- (1)  $-i$       (2)  $i$       (3) 1      (4)  $-1$

29. The number of vectors of unit length perpendicular to the vectors  $\hat{i} + \hat{j} + \hat{k}$  and  $\hat{i} + \hat{j} + \hat{k}$  is :

- (1) 2      (2) 1      (3) 3      (4) infinite

30. A force  $\vec{F} = 2\hat{i} - \hat{j} + \hat{k}$  is acting at a point which is displaced from point A to B. If the position vectors of A and B are  $2\hat{i} + \hat{j} + 2\hat{k}$  and  $3\hat{i} - \hat{j} + 2\hat{k}$  respectively, the work done by the force is :

- (1) 2 units      (2) 3 units      (3) 4 units      (4) 5 units



31. A force  $\vec{F} = \hat{i} + 2\hat{j} + 3\hat{k}$  is acting at a point A whose position relative to origin is  $\hat{i} + \hat{j} + \hat{k}$ . The moment of the force about the origin is :

- (1)  $\hat{i} + 2\hat{j} + \hat{k}$  (2)  $\hat{i} - 2\hat{j} + \hat{k}$   
 (3)  $\hat{i} + \hat{j} - 2\hat{k}$  (4)  $\hat{i} + \hat{j} + 2\hat{k}$

32. If the vectors  $\vec{a} = 3\hat{i} + \hat{j} - 2\hat{k}$ ,  $\vec{b} = -\hat{i} + 3\hat{j} + 4\hat{k}$  and  $\vec{c} = 4\hat{i} - 2\hat{j} + \lambda\hat{k}$  form the sides of a triangle, then the value of  $\lambda$  is :

- (1) 2 (2) -4 (3) -6 (4) 6

33. A rigid body is rotating at 2.5 radians per second about an axis AB, where A and B are points  $\hat{i} - 2\hat{j} + \hat{k}$  and  $3\hat{i} - 4\hat{j} + 2\hat{k}$ . The velocity of the particle P of the body at the point  $5\hat{i} - \hat{j} - \hat{k}$  is :

- (1)  $\hat{i} - 5\hat{j} + 6\hat{k}$  (2)  $-2\hat{i} + 13\hat{j} + 8\hat{k}$   
 (3)  $2\hat{i} - \hat{j} + \hat{k}$  (4)  $5\hat{i} - 4\hat{j} + 6\hat{k}$

34. Find 'a' such that the vectors  $2\hat{i} - \hat{j} + \hat{k}$ ,  $\hat{i} + 2\hat{j} - 3\hat{k}$  and  $3\hat{i} + a\hat{j} + 5\hat{k}$  are coplanar :

- (1) -4 (2) 4 (3) -2 (4) 2

35. Weights of 1 gm, 2 gm, ..... 100 gm are hanging at marks 1, 2, ....100 of a metre-scale. The scale will be balanced at the point marked as :

- (1) 50 (2) 60 (3) 65 (4) 67

36. A body of weight 4 kg rests in limiting equilibrium on an inclined plane whose slope is  $30^\circ$ . The normal reactions and co-efficient of frictions are, respectively :

(1)  $2\sqrt{3}$  kg,  $\frac{1}{\sqrt{3}}$                       (2)  $2\sqrt{3}$  kg,  $\frac{1}{\sqrt{2}}$

(3)  $3\sqrt{2}$  kg,  $\frac{1}{\sqrt{3}}$                       (4)  $3\sqrt{2}$  kg,  $\frac{1}{\sqrt{2}}$

37. The semi-vertical angle of cone of friction is  $30^\circ$ . The co-efficient of friction is :

(1)  $\frac{1}{\sqrt{3}}$                       (2)  $\frac{1}{\sqrt{2}}$                       (3)  $\frac{\sqrt{3}}{2}$                       (4)  $\frac{1}{3}$

38. A uniform rod rests entirely within a smooth spherical bowl. Its inclination to the horizontal is :

(1)  $0^\circ$                       (2)  $30^\circ$                       (3)  $35^\circ$                       (4)  $45^\circ$

39. A body travelling along a straight line traversed one-third the distance with a velocity of 5 m/s. The remaining part of the distance was covered with velocity 3 m/s for half the time and with velocity 2 m/s for the other half of the time.

The average velocity of the body over the whole time of motion will be :

(1) 2 m/s                      (2) 2.5 m/s                      (3) 3 m/s                      (4) 5 m/s

40. A projectile is thrown with an initial velocity  $\vec{v} = (p\hat{i} + q\hat{j})$  m/s. If the range of the projectile is double the maximum height reached by it, then :

(1)  $p = 2q$                       (2)  $q = 4p$                       (3)  $q = 2p$                       (4)  $q = p$

41. The position of a particle  $x$  (in metres) at a time  $t$  second is given by the relation :

$$\vec{r} = 3 + \hat{i} - t^2 \hat{j} + 4\hat{k}$$

The magnitude of velocity (in m/s) of the particle after 5 seconds is :

- (1)  $\sqrt{102}$       (2)  $\sqrt{109}$       (3)  $\sqrt{110}$       (4)  $\sqrt{113}$
42. If  $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$  are in AP, then :
- (1)  $a, b, c$  are in AP      (2)  $a, b, c$  are in HP
- (3)  $a^2, b^2, c^2$  are in AP      (4)  $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$  are in AP
43. If  $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \dots = \frac{\pi^2}{6}$ , Then  $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots$  equals :
- (1)  $\frac{\pi^2}{8}$       (2)  $\frac{\pi^2}{9}$       (3)  $\frac{\pi^2}{12}$       (4)  $\frac{\pi^2}{18}$
44. If  $s = 1 + a + a^2 + \dots$ , ( $a < 1$ ), then  $a = ?$
- (1)  $\frac{s}{s-1}$       (2)  $\frac{s}{1-s}$       (3)  $\frac{s-1}{s}$       (4)  $\frac{1-s}{s}$
45. The sum of integers from 1 to 60 that are divisible by 2 or 3 is
- (1) 330      (2) 1230      (3) 1560      (4) 1830

46. The fifth, tenth and fifteenth terms of a GP are  $p, q, r$  respectively. Then :

- (1)  $p^2 = qr$  (2)  $q^2 = pr$   
 (3)  $r^2 = pq$  (4)  $pqr = 1$

47. The sum of  $n$  terms of  $\frac{1}{2} + \frac{3}{4} + \frac{7}{8} + \frac{15}{16} + \dots$  is :

- (1)  $n + 2^n - 1$  (2)  $n + 2^{n-1} - 1$   
 (3)  $n - 2^{n-1} - 1$  (4)  $n - 2^n - 1$

48. The value of  $\sum_{r=1}^n \frac{{}^n P_r}{r!}$  is :

- (1)  $2^{n-1}$  (2)  $2^n$  (3)  $2^n - 1$  (4)  $2^{n-1} + 1$

49. The sum of the digits in the unit place of all the four digit numbers formed with 2, 3, 4, 5 taken all at a time, is :

- (1) 14 (2) 42 (3) 84 (4) 336

50. The area of the figure bounded by the curves  $y = e^x, e^{-x}$  and the straight line  $x = 1$  is :

- (1)  $e + e^{-1}$  (2)  $e + e^{-1} - 2$   
 (3)  $e + e^{-1} - 1$  (4)  $e - e^{-1} + 1$

51. The orthocentre of the triangle formed by  $x = 3, y = 4$  and  $4x + 3y = 12$  is at the point :

- (1) (3, 0) (2) (0, 4) (3)  $(\frac{3}{2}, 2)$  (4) (3, 4)

52. The lines represented by the equation  $Ax^2 + 2Bxy + Cy^2 = 0$  are perpendicular, if :

- (1)  $A + B = 0$  (2)  $A + C = 0$   
 (3)  $B + C = 0$  (4)  $AC = -1$

53. The medians AD and BE of the triangle ABC with vertices A (0, b), B (0, 0) and C (a, 0) are mutually perpendicular is :

- (1)  $a = b$  (2)  $ab = -1$   
 (3)  $a = \pm\sqrt{2} b$  (4)  $b = \pm\sqrt{2} a$

54. The circle  $x^2 + y^2 - 4x - 6y - 12 = 0$  cuts an intercept on x - axis of length :

- (1) 8 (2) 6 (3) 4 (4) 2

55. The circles  $x^2 + y^2 = 1$  and  $x^2 + y^2 - 2x - 2y - 1 = 0$  :

- (1) do not intersect (2) touch internally  
 (3) touch externally (4) intersect at two points

56. The vertex of the parabola  $y^2 + 6x - 2y + 13 = 0$  is :

- (1) (-2, -1) (2) (-2, 1) (3) 2, -1 (4) (2, 1)

57. If (a, 1) is the mid- point of a chord passing through the vertex of the parabola  $y^2 = 4x$ , then :

- (1)  $2a = 1$  (2)  $a = 1$  (3)  $a = 2$  (4)  $a^2 = 1$



63. The contents of an 8-bit register are `|||| ||||`. If the represented number is in signed - 1's complement form, the decimal equivalent of the number is :

- (1) -127      (2) 127      (3) 128      (4) -0

64. USB stands for :

- (1) Universal Standard Bus      (2) Universal Serial Bus  
(3) Unified Standard Bus      (4) Uniform Serial Bus

65. Level 1 cache is a form of :

- (1) processor      (2) input device  
(3) output device      (4) memory

66. The number of bits required to encode 30 pieces of information is

- (1) 4      (2) 5      (3) 6      (4) 7

67. Which of the following is **not** a valid library function in the C programming language ?

- (1) peek ()      (2) poke ()      (3) atoc ()      (4) malloc ()

68. What is the output of the following C-program ?

```
#include <stdio.h>
void main ( )
{
char letter = 'z';
printf ("\n %c", letter);
}
```

- (1) z      (2) 90  
(3) Error      (4) Garbage value

69. Specify the output of the following C- program :

```
# include < stdio. h>
void main ( )
{
int a = 10, b = 20 ;
char x = 1, y = 0 ;
if (a, b, x, y)
{
printf ("EXAM");
}
}
```

- (1) AM is printed                      (2) EXA is printed  
(3) Compile error                      (4) None of the above

70. Hexadecimal equivalent of Octal 1217 is :

- (1) 1217              (2) 028F              (3) 2297              (4) 0BI7

71. In a certain code language 'COMPUTRONE' is written as 'PMOCTUENOR'. How is 'ADVANTAGES' written in the same code ?

- (1) IDUJLAIC                      (2) AVDATNSEGA  
(3) ADVATNSAGE                      (4) AVDANTSEGA

72. If CAT = 12 then MAN = ?

- (1) 14                      (2) 24  
(3) 16                      (4) None of these



73. If 'Lily' is called 'Lotus', 'Lotus' is called 'Rose', 'ROSE' is called 'Sunflower' and 'Sunflower' is called 'Marigold', then which will be the national flower of India ?

- |          |              |
|----------|--------------|
| (1) Lily | (2) Lotus    |
| (3) Rose | (4) Marigold |

**Directions (Q No. 74-76) :** In each of the following questions, there is certain relationship between two given words on one side of " :: " and one word is given on the other side of it, while another word is to be selected from the given alternatives having the same relationship with the word, as the words of the given pair bear.

Chosse the correct alternatives :

74. Malaria : Disease :: Spear : ?

- |            |           |
|------------|-----------|
| (1) Wound  | (2) Sword |
| (3) Weapon | (4) Death |

75. Food : Stomach :: Fuel : ?

- |            |                |
|------------|----------------|
| (1) Engine | (2) Plane      |
| (3) Truck  | (4) Automobile |

76. Fire : Ashes :: Explosion : ?

- |           |            |
|-----------|------------|
| (1) Flame | (2) Death  |
| (3) Sound | (4) Debris |

**Directions (Q.Nos. 77- 83) :** The following questions consist of two words that have certain relationship between each other, followed by four letter pairs of words. Select the related pair that has the same relationship as the original pair of words :

**77. Fodder : Cattle :: ?**

- |                   |                   |
|-------------------|-------------------|
| (1) Pen : Ink     | (2) Ball : Stick  |
| (3) Fruit : Juice | (4) Grass : Horse |

**78. Horse : Hoof :: ?**

- |                   |                  |
|-------------------|------------------|
| (1) Man : Foot    | (2) Dog : Black  |
| (3) Paise : Rupee | (4) Pen : Pencil |

**79. Sailor : Compass :: ?**

- |                    |                          |
|--------------------|--------------------------|
| (1) Student : Exam | (2) Doctor : Stethoscope |
| (3) Pen : Officer  | (4) Painter : Artist     |

**80. Cells : Cytology :: ?**

- |                           |                          |
|---------------------------|--------------------------|
| (1) Worms : Ornithology   | (2) Insects : Entomology |
| (3) Diseases : Physiology | (4) Tissues : Morphology |

**81. Sin : Crime :: ?**

- |                         |                   |
|-------------------------|-------------------|
| (1) Man : Animal        | (2) Home : Court  |
| (3) Morality : Legality | (4) Jury : Priest |

**82. Man : Mammal :: ?**

- |                         |                        |
|-------------------------|------------------------|
| (1) Liberty : Literate  | (2) Hail : Snow        |
| (3) Native : Inhabitant | (4) Offspring : Family |

83. Spring : Elasticity :: ?

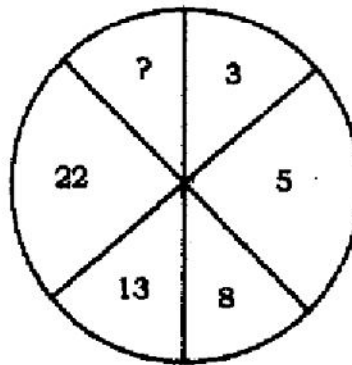
- (1) Person : Whims (2) Wool : Warmth  
(3) Marketing : Advertising (4) Radio : Broadcast

**Directions : (Q.Nos. 84 - 90) :** In each of the following questions, four pair of words are given, out of these words one pair does not bear the common relationship which rest bear. You are required to find that **odd** pair :

84. (1) Needle - Prick (2) Gun - Fire  
(3) Auger, - Bore (4) Chisel - Carve
85. (1) Lion - Roar (2) Snake - Hiss  
(3) Bees - Hum (4) Frog - Bleat
86. (1) Dim - Bright (2) Wrong - Right  
(3) Shallow - Deep (4) Genuine - Real
87. (1) Oil - Lamp (2) Water - Tap  
(3) Oxygen - Life (4) Power - Machine
88. (1) Cat - Mouse (2) Lion - Dear  
(3) Cow - Hen (4) Hawk - Pigeon
89. (1) Captain - Team (2) Boss - Gang  
(3) Chief Minister - Cabinet (4) Artist - Troupe
90. (1) Hard - Soft (2) Pointed - Blunt  
(3) Sweet - Soar (4) Long - High

14P/203/31(i)

91. A man starts from a point 'X' and walks 3 km southwards, then he turns left and walks 6 km. In which direction is he from the starting point ?
- (1) South - West                      (2) South - East  
(3) West                                (4) South
92. Ram and shyam start walking in opposite directions. Ram covers 6 km and Shyam 8 km. Then Ram turns right and walks 8 km and Shyam turns Left and walks 6 km. How far everyone is from the starting point ?
- (1) 11 km      (2) 8 km      (3) 9 km      (4) 10 km
93. If 18<sup>th</sup> February, 2009 is a Friday, then what will be the day of 18<sup>th</sup> February, 2011 ?
- (1) Sunday      (2) Monday      (3) Tuesday      (4) Wednesday
94. Which number, in the given series, is wrong ?
- 160, 118, 83, 65, 34, 20
- (1) 83      (2) 118      (3) 34      (4) 65
95. Find the missing number in the following :



- (1) 1                      (2) 26                      (3) 39                      (4) 45

96. If (i) 'A-B' means 'A is father of B'  
 (ii) 'A + B' means 'A is daughter of B'  
 (iii) 'A × B' means 'A is son of B'  
 (iv) 'A ÷ B' means 'A is wife of B'

Which of the following means P is grandson of S ?

- (1)  $P + Q - S$  (2)  $P + Q \times S$   
 (3)  $P + Q + S$  (4)  $P \times Q + S$

97. Today is Monday. After 61 days, it will be :

- (1) Wednesday (2) Saturday  
 (3) Tuesday (4) Thursday

98. Consider the statement :

$$A = B \quad C \geq D = E \leq F$$

Conclusions I :  $F > B$

II :  $B \geq D$

In your opinion :

- (1) Only conclusion I follows  
 (2) Only conclusion II follows  
 (3) Either conclusion I or II follows  
 (4) Neither conclusion I nor II follows

99. Consider the statement :

Imprisonment for 27 years made Nelson Mandela the President.

Assumptions

I : Only who will be imprisoned for 27 years will become the President.

II : To become the President, imprisonment is a qualification.

In your opinion :

- (1) Only Assumption I is implicit
- (2) Only Assumption II is implicit
- (3) Either I or II is implicit
- (4) Neither I nor II is implicit

100. How many times are the hands of a clock at right angle in a day ?

- (1) 22
- (2) 24
- (3) 44
- (4) 48

101. Karl Pearson's coefficient of skewness is given by :

- (1)  $\frac{AM - Median}{SD}$
- (2)  $\frac{AM - Mode}{SD}$
- (3)  $\frac{Median - Mode}{SD}$
- (4)  $\frac{AM - Mode}{Median}$

102. If standard deviation of  $\{x_1, x_2, \dots, x_n\}$  is S, then the standard deviation of  $\{1-2x_1, 1-2x_2, \dots, 1-2x_n\}$  is equal to

- (1)  $1 - 2S$
- (2)  $-2S$
- (3)  $2S$
- (4)  $1 - S$

103. If  $X$  and  $Y$  are two variables such that  $SD(X+Y) \geq SD(X-Y)$  then :

- (1)  $-1 \leq r(X, Y) \leq 0$                       (2)  $0 \leq r(X, Y) \leq 1$   
 (3)  $r(X, Y) = 0$                               (4)  $r(X, Y) = \pm 1$

104. If two lines of regression of  $Y$  on  $X$  and  $X$  on  $Y$  are respectively  $a_1 x + b_1 y + c_1 = 0$  and  $a_2 x + b_2 y + c_2 = 0$ , then :

- (1)  $a_1 a_2 \leq b_1 b_2$                               (2)  $a_1 b_2 \leq a_2 b_1$   
 (3)  $a_1 b_2 \geq a_2 b_1$                               (4)  $a_1 a_2 \geq b_1 b_2$

105. For any two events  $A$  and  $B$ , the probability that exactly one of the two events occurs, is given by :

- (1)  $P(A) + P(B) - P(A \cap B)$               (2)  $P(A) + P(B) - 2P(A \cap B)$   
 (3)  $1 - P(A \cap B)$                               (4)  $1 - P(A \cup B)$

106. A fair coin is tossed repeatedly. If head appears in first four tosses, then the probability of head appearing in the fifth toss is :

- (1)  $\frac{1}{32}$                       (2)  $\frac{1}{5}$                       (3)  $\frac{1}{2}$                       (4)  $\frac{31}{32}$

107. Consider the LPP :

$$\text{Minimize } Z = 3x + 5y$$

$$\text{subject to } x \geq 3; y \geq 1; 2x + y \geq 5$$

Redundant constraint in this LPP is :

- (1)  $2x + y \geq 5$                               (2)  $y \geq 1$   
 (3)  $x \geq 3$                                       (4) None of these

108. Solve the LPP :

Maximize  $Z = 2x + 3y$

Subject to  $x \leq 3; y \leq 3; x + y \leq 5; x, y \geq 0$

What do you find ?

- (1) Optimal solution is at  $x = 2, y = 3$ ; Maximum value of  $Z = 12$
- (2) Optimal solution is at  $x = 3, y = 2$ ; Maximum value of  $Z = 12$
- (3) Optimal solution is at  $x = 3, y = 2$ ; Maximum value of  $Z = 13$
- (4) Optimal solution is at  $x = 2, y = 3$ ; Maximum value of  $Z = 13$

109. If sets A and B are defined as :

$$A = \{ (x, y) \mid y = e^x, x \in \mathbb{R} \}$$

$$B = \{ (x, y) \mid y = x, x \in \mathbb{R} \}$$

Then :

- (1)  $A \subset B$
- (2)  $B \subset A$
- (3)  $A \cap B = \phi$
- (4)  $A \cup B = A$

110. In a battle 71% of the combatants lost an eye, 82% an ear, 74% an arm and 83% a leg. If  $x\%$  lost all the four limbs, then the minimum value of  $x$  :

- (1) can not be determined
- (2) 10
- (3) 71
- (4) None of these

111. If  $\tan \theta \tan 2\theta = 1$ , then  $\theta = ?$

- (1)  $n\pi + \frac{\pi}{6}$
- (2)  $n\pi \pm \frac{\pi}{6}$
- (3)  $2n\pi \pm \frac{\pi}{6}$
- (4)  $2n\pi + \frac{\pi}{6}$



112. If  $\sin x + \sin 3x + \sin 5x = 0$ , then the value of  $x$  such that

$0 < x \leq \frac{\pi}{2}$  is :

- (1)  $\frac{\pi}{12}$                       (2)  $\frac{\pi}{6}$                       (3)  $\frac{\pi}{4}$                       (4)  $\frac{\pi}{3}$

113. The equation  $a \cos x + b \sin x = c$  where  $|c| > \sqrt{a^2 + b^2}$  has :

- (1) no solution  
 (2) a unique solution  
 (3) two solutions  
 (4) an infinite number of solutions

114. The domain of  $\sin^{-1} x$  is :

- (1)  $(-1, 1)$                       (2)  $(-\pi, \pi)$                       (3)  $(0, 2\pi)$                       (4)  $(-\infty, \infty)$

115.  $\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{2}{9}\right) = ?$

- (1)  $\tan^{-1}\left(\frac{1}{18}\right)$                       (2)  $\tan^{-1}\left(\frac{17}{36}\right)$   
 (3)  $\tan^{-1}\left(\frac{1}{2}\right)$                       (4)  $\left(\frac{1}{2}\right) \tan^{-1}\left(\frac{3}{5}\right)$

116. If the sides of a triangle are 7 cm,  $4\sqrt{3}$  cm and  $\sqrt{13}$  cms respectively, then the smallest angle is :

- (1)  $15^\circ$                       (2)  $30^\circ$                       (3)  $45^\circ$                       (4)  $60^\circ$



122. If the ratio of the roots of  $x^2 + bx + c = 0$  and  $x^2 + qx + r = 0$  be the same, then :

- (1)  $b^2q = cr^2$       (2)  $b^2r = q^2c$       (3)  $bq = cr$       (4)  $br = cq$

123. The number of roots of the equation :

$$9 \sec^2 \theta - 9 \sec \theta + 2 = 0,$$

is :

- (1) 0      (2) 1      (3) 2      (4) 4

124. There are 4 letters and 4 directed envelopes. The number of ways all the letters are placed in a wrong envelope is :

- (1) 6      (2) 8      (3) 9      (4) 12

125. Four men and four women are to sit around a circular table such that there is a man on either side of every woman. The number of seating arrangements is :

- (1)  $3! \times 4!$       (2)  $(3!)^2$       (3)  $(4!)^2$       (4)  $2(3!)^2$

126. If the sum of the co-efficients in the expansion of  $(a + b)^n$  is 1024, then the largest coefficient in the expansion is :

- (1) 84      (2) 126      (3) 168      (4) 252

127. Consider the following statements :

A : Matrix multiplication is associative.

B : Matrix multiplication is not commutative, in general.

C : Product of two matrices may be a null matrix, while neither of them is a null matrix.

In your opinion :

- (1) A is incorrect  
 (2) B is incorrect  
 (3) C is incorrect  
 (4) All the three statements are correct

128. From the matrix equation  $AB = AC$  we can conclude  $B = C$  provided  $A$  is :

- (1) Singular (2) Non-singular  
(3) Symmetric (4) Square

129. Consider the following statements :

$$A = \lim_{x \rightarrow 0} (1 + \lambda x)^{1/x} = e^\lambda; B = \lim_{x \rightarrow \infty} \left(1 + \frac{\lambda}{x}\right)^x = e^{-\lambda}$$

In your opinion :

- (1) Only A is correct (2) Only B is correct  
(3) Both A and B are correct (4) Both A and B are incorrect

130. If  $x^y = a^b$ ,  $a, b$  being constants, then  $\frac{dy}{dx} = ?$

- (1)  $\frac{y}{x \log x}$  (2)  $\frac{y \log x}{x}$  (3)  $-\frac{y}{x \log x}$  (4)  $\frac{x}{y \log x}$

131. If  $\tan^{-1} 4x + \tan^{-1} 6x = \frac{\pi}{4}$ , then  $x$  equal to :

- (1)  $\frac{1}{12}$  (2)  $-\frac{1}{2}$   
(3)  $-\frac{1}{12}$  (4) None of these

132. If  $\mu$  is the coefficient of friction between two bodies in contact, then :

- (1)  $0 \leq \mu \leq 1$  (2)  $-1 \leq \mu \leq 1$  (3)  $-\frac{1}{2} \leq \mu \leq \frac{1}{2}$  (4)  $\mu > 1$

133. For  $2 \leq r \leq n$ ,  ${}^n C_r + 2 {}^n C_{r-1} + {}^n C_{r-2} = ?$

- (1)  ${}^{n+1} C_{r-1}$       (2)  $2 {}^{n+1} C_{r-1}$       (3)  $2 {}^{n+2} C_r$       (4)  ${}^{n+2} C_r$

134. If  $f(x) = \frac{x-1}{x+1}$ , then  $f(2x)$  is :

- (1)  $\frac{f(x)+1}{f(x)+3}$       (2)  $\frac{3f(x)+1}{f(x)+3}$       (3)  $\frac{f(x)+3}{f(x)+1}$       (4)  $\frac{f(x)+1}{f(x)+3}$

135. The line  $x + y = 6$  is normal to the parabola  $y^2 = 8x$  at the point :

- (1) (4, 2)      (2) (2, 4)      (3) (2, 2)      (4) (3, 3)

136. The largest revenue source in India is :

- (1) Railways      (2) Sales Tax  
(3) Excise Duty      (4) Direct Tax

137. Which of the following is **not** provided in the Constitution of India ?

- (1) Election Commission      (2) Finance Commission  
(3) Public Service Commission      (4) Planning Commission

138. Which of the following cities is known as the commercial capital of India ?

- (1) New Delhi      (2) Kolkata  
(3) Chennai      (4) Mumbai

139. Who founded the Bharatiya Janasangh ?

- (1) Dr. Shyama Prasad Mukherjee  
(2) Deen Dayal Upadhyaya  
(3) Veer Savarkar  
(4) Atal Behari Vajpayee

140. Tides in sea are caused by :

- (1) Effect of Sun
- (2) Effect of Moon
- (3) Combined effect of Sun and Moon
- (4) Gravitational, centripetal and centrifugal forces

141. Polio myelitus is a type of :

- (1) bacterial disease
- (2) viral disease
- (3) fungal disease
- (4) none of these

142. Who is the present Governor of Reserve Bank of India ?

- (1) D. Subbarao
- (2) C. Rangarajan
- (3) Raghuram Rajan
- (4) Osborne Smith

143. What is the name of the first antibiotic discovered ?

- (1) Pennicilin
- (2) Streptomycin
- (3) Actinomycin
- (4) Tetracycline

144. The next Common Wealth Games will be held in :

- (1) Edinburgh
- (2) Kuala Lumpur
- (3) Glasgow
- (4) Gold Coast

145. The President of India can be removed from his office by the :

- (1) Prime Minister
- (2) Lok Sabha
- (3) Chief Justice of India
- (4) Parliament

146. Fill in the blanks by selecting one from the given alternatives :

"Ram, you can call me \_\_\_\_\_ Mondya \_\_\_\_\_ 3 O'clock \_\_\_\_\_ the after noon."

- |                |                |
|----------------|----------------|
| (1) in, on, at | (2) at, on, in |
| (3) on, at, in | (4) in, at, on |

147. What is the synonym of 'Crucial' ?

- |                         |               |
|-------------------------|---------------|
| (1) Active              | (2) Dependent |
| (3) Extremely important | (4) Reserve   |

148. "Birds of same \_\_\_\_\_ flock together. "

Fill in the blank from the given alternatives :

- |             |             |
|-------------|-------------|
| (1) feather | (2) colour  |
| (3) group   | (4) foreign |

149. "My best friend, John, is named \_\_\_\_\_ his grandfather."

Fill in the gap by the appropriate alternative :

- |           |           |
|-----------|-----------|
| (1) to    | (2) about |
| (3) after | (4) on    |

150. Fill in the gap by the alternatives :

"I told you about the incident yesterday, \_\_\_\_\_"

- |            |           |
|------------|-----------|
| (1) didn't | (2) don't |
| (3) do     | (4) did   |

## अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर केवल नीली-काली बाल-प्वाइंट पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 10 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।
2. परीक्षा भवन में लिफाफा रहित प्रवेश-पत्र के अतिरिक्त, लिखा या सादा कोई भी खुला कागज साथ में न लायें।
3. उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।
4. अपना अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।
5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।
6. ओ० एच० आर० पत्र पर अनुक्रमांक संख्या, प्रश्नपुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुक्रमांक और ओ० एच० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।
7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।
8. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिए आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।
9. प्रत्येक प्रश्न के उत्तर के लिए केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर यह उत्तर गलत माना जायेगा।
10. ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो संबंधित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. रफ कार्य के लिए प्रश्न-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा उत्तर-पुस्तिका के अंतिम पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त केवल ओ एच आर उत्तर-पत्र परीक्षा भवन में जमा कर दें।
13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।
14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का/की, भागी होगा/होरी।