M.C.A.

10P/203/21

Set No. – II Question Booklet No. .....

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

Roll No. | | | | | | | | |

Roll No.

(Write the digits in words) .....

Serial No. of 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 changes in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfairmeans.
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 *both the Question Booklet and the 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.

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

Total No. of Printed Pages : 22

No. of Questions : 150

Time : $2\frac{1}{2}$ Hours] *[Full Marks : 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.

(2) If more than one alternative answers seem to be approximate to the correct answer, choose the closest one.

Directions : (Question Nos. **1 and 2***) :* In the following questions, choose the word, which is most nearly OPPOSITE in the meaning to the bold word and mark it in the Answer Sheet.

1. Worldly-wise people find it prudent to adopt a morally **flexible** attitude towards current behaviour patterns.

(1) weak (2) uncompromising

(3) hostile (4) neutral

2. His bearing at his father's funeral lacked **gravity**.

(1) humility (2) levity (3) joy (4) seriousness

Directions : (Question Nos. **3 and 4***) :* In the following questions, choose the word, which is most nearly the same in meaning to the bold word and mark it in the Answer Sheet.

3. The group is quite **heterogeneous** some are very rich while some are very poor.

(1) uniform (2) confusing (3) varied (4) contradictory

4. The device which **measures** earth-quakes is called the Richter Scale ?

(1) calculates (2) gauges (3) weights (4) prevents

5. Write down the correct answer in the given questions ?

(1) Dog is a faithful animal (2) The dog is a faithful animal

(3) The dog are a faithful animal (4) The dogs are a faithful animal

6. The Arjuna Awards are given for proficiency in which of the following ?

(1) Warfare (2) Mountaineering

(3) Journalism (4) Sports

7. Which of the following industries makes use of animal produced raw material ?

(1) Cotton textile mills (2) Jute mills

(3) Silk mills (4) Rayon mills

8. In which of the following countries did the decimal system of numbers originate ?

(1) India (2) England (3) France (4) Germany

9. The New Year Day of the Indian Solar Calendar falls on which of the following dates ?

(1) January 1 (2) January 14 (3) March 21/22 (4) April 13/14

10. Deficiency of which of the following vitamins causes 'Ricket' ?

(1) A (2) B (3) C (4) D

11. Consider the following program fragment

```
char c = 'a' ;
while (c++ < = 'z')
    putchar (xxx);
```

If the required output is abcd ..... xyz, then xxx should be :

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

12. If integer needs two bytes of storage, then maximum value of a signed integer is :

(1) $2^{16}-1$ (2) $2^{15}-1$ (3) 2^{16} (4) 2^{15}

13. Length of the string "Correct" is :

(1) 7 (2) 8

(3) 6 (4) implementation dependent

14. The minimum number of temporary variables needed to swap the contents of two variables is :

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

15. C is a :

(1) high level language

(2) low level language

(3) high level language with some low level features

(4) machine language

16. C was primarily developed as a :

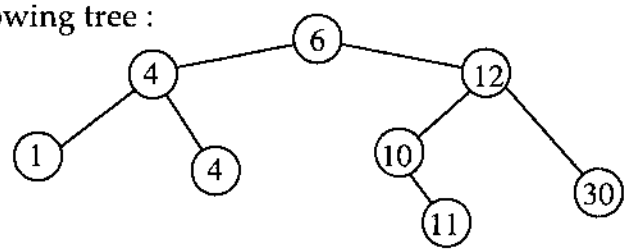
(1) systems programming language (2) general purpose language

(3) data processing language (4) machine language

17. In the Boolean Algebra the value of $x + x.(y + 1)$ is equal to :

(1) x (2) y (3) 1 (4) 0

18. Consider the following tree :



If this tree is used for sorting, then a new number 8 should be placed at the :

(1) left child of node labelled 30 (2) right child of node labelled 5

(3) right child of node labelled 30 (4) left child of node labelled 10

19. The heart and the nerve centre of a computer is its :

(1) output unit (2) input unit (3) C. P. U. (4) memory

20. A C. P. U. consist of :

(1) input unit

(2) output unit

(3) memory unit

(4) arithmetic and logical unit, control unit

Directions : (Question Nos. 21-25) :

In these questions different alphabets stand for various symbols as indicated below :

Addition	:	O
Subtraction	:	M
Multiplication	:	A
Division	:	Q
Equal to	:	X
Greater than	:	Y
Less than	:	Z

Out of the four alternatives given in these questions, only one is correct according to the above letter symbols identify the correct answer.

21. (1) 2 Y 1 A 1 Q 1 O 1 A 1 (2) 16 Z 8 A 3 O 1 A 2 M 2
(3) 32 X 8 Q 2 A 3 Q 1 A 2 (4) 14 X 2 A 4 A 2 M 2 Q 1

22. (1) 5 Q 5 A 5 O 5 Y 5 A 2 (2) 2 Q 1 O 10 A 1 Z 6 A 4
(3) 1 O 1 Q 1 M 1 Y 3 Q 1 (4) 3 O 2 O 10 Q 2 X 10 Y 2

23. (1) 8 O 2 A 12 Q 10 X 18 Q 9 (2) 2 O 3 M 4 Q 2 Z 1 A 2
(3) 8 Q 4 A 1 M 2 X 16 M 16 (4) 6 Q 2 O 1 O 1 X 16 A 1

24. (1) 8 Y 2 A 3 A 4 Q 2 A 4 (2) 10 X 2 O 2 A 4 O 1 M 2
(3) 12 X 4 O 2 Q 1 A 4 A 2 (4) 2 Z 2 A 4 O 1 A 4 M 8

25. (1) 3 O 2 X 2 Q 1 A 3 O 1 (2) 10 A 2 Y 2 Q 1 A 10 Q 2
(3) 10 A 2 Z 2 Q 2 A 10 Q 2 (4) 6 M 2 Y 10 Q 2 A 3 O 1

Directions : (Question Nos. 26-30) :

The following five questions are based on statements. Read them carefully and find the correct answer out of the alternatives given under each.

Madhu and Shivani are good in Dramatics and Computer Science.
Asha and Madhu are good in Computer Science and Physics.
Asha, Pratibha and Namita are good in Physics and History.
Namita and Asha are good in Physics and Mathematics.
Pratibha and Shivani are good in History and Dramatics

26. Who is good in Computer Science, History and Dramatics ?
(1) Asha (2) Madhu (3) Namita (4) Shivani

27. Who is good in Physics, Dramatics and Computer Science ?
(1) Pratibha (2) Shivani (3) Madhu (4) Asha

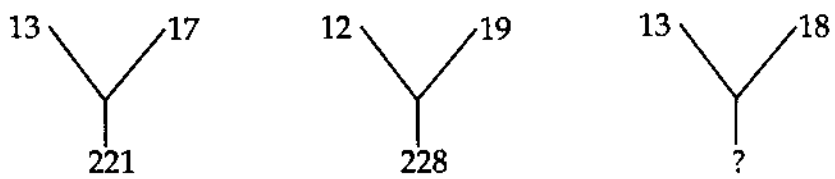
28. Who is good in Physics, History and Dramatics ?
(1) Madhu (2) Pratibha (3) Shivani (4) Asha

29. Who is good in History, Physics, Computer Science and Mathematics ?
(1) Asha (2) Namita (3) Madhu (4) Pratibha

30. Who is good in Physics, History and Mathematics, but not in Computer Science ?
(1) Asha (2) Pratibha (3) Madhu (4) Namita

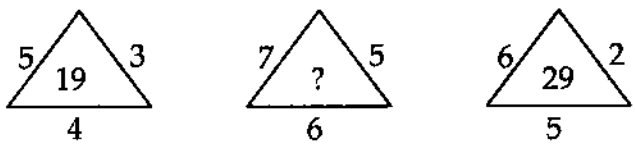
Directions : (Question Nos. **31-35***) :*
Which number should come in place of question mark (?) in the following questions :

31.



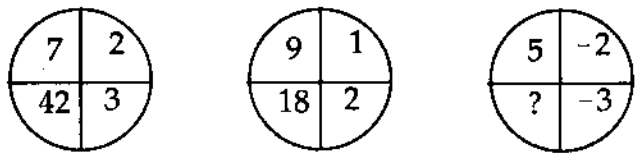
(1) 31 (2) 229 (3) 234 (4) 312

32.



(1) 25 (2) 47 (3) 37 (4) 41

33.



(1) 18 (2) 13 (3) 30 (4) -30

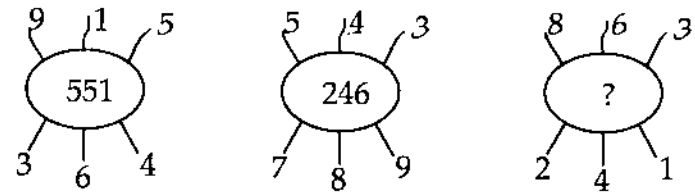
34.

9	5	6
5	7	?
3	4	5
135	140	150

(1) 8 (2) 10 (3) 5 (4) 4

P.T.O.

35.



(1) 631 (2) 622 (3) 624 (4) 262

Directions : (Question Nos. 36-41) :

Which number is wrong in the given series ?

36. 1, 2, 9, 37, 65, 126, 217 :

(1) 2 (2) 9 (3) 37 (4) 65

37. 4, 10, 6, 11, 17, 12, 20, 24, 20, 31, 37 :

(1) 20 (2) 24 (3) 31 (4) 37

38. 1, 4, 8, 6, 9, 12, 16, 14, 17, 23, 24, 22 :

(1) 24 (2) 23 (3) 17 (4) 22

39. 2, 3, 6, 15, 52.5, 157.5, 630 :

(1) 15 (2) 52.5 (3) 157.5 (4) 3

40. 5, 7, 13, 25, 44, 75, 117 :

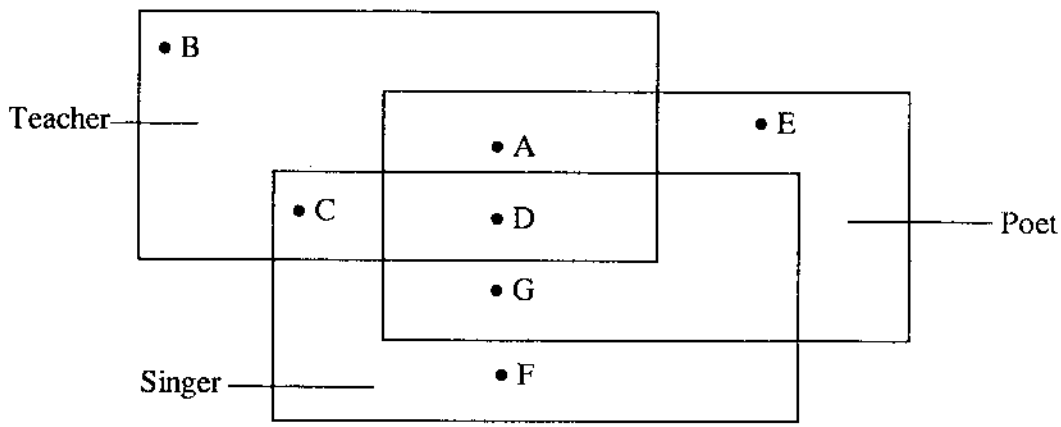
(1) 7 (2) 13 (3) 25 (4) 44

41. 6, 18, 36, 108, 216, 648, 1290, 3888 :

(1) 36 (2) 108 (3) 1290 (4) 648

Directions : (Question Nos. 42-45) :

In the following figure, there are given some rectangles which represent the particular qualities. Read the questions and find out the appropriate answer from the figure :



42. The poet, who is neither a singer nor a teacher, is :

(1) D (2) E (3) G (4) A

43. The teacher, who is singer and poet, both is :

(1) A (2) B (3) C (4) D

44. The teacher who is a singer but *not* a poet is :

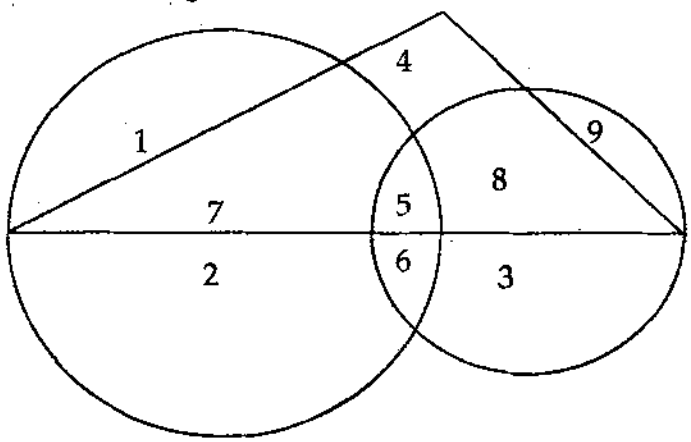
(1) A (2) B (3) C (4) D

45. The teacher who is neither a singer nor a poet is :

(1) A (2) B (3) D (4) G

Directions : (Question Nos. 46-50) :

These questions are based on the following diagram in which the triangle represents female graduates, small circle represents self-employed females and the big circle represents self-employed females with bank loan facility. Numbers are shown in the different sections of the diagram. On the basis of these numbers, answer the following questions.



46. How many non-graduate females are self-employed ?

(1) 11 (2) 9 (3) 12 (4) 21

47. How many female graduates are self-employed ?

(1) 12 (2) 13 (3) 20 (4) 15

48. How many female graduates are *not* self-employed ?

(1) 4 (2) 10 (3) 12 (4) 15

49. How many non-graduate self-employed females are with bank loan facility ?

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

50. How many self-employed female graduates are with bank loan facility ?
(1) 5 (2) 12 (3) 20 (4) 7

51. The rate of doing work per unit of time is called :
(1) Impulse (2) Work (3) Energy (4) Power

52. A particle is projected with initial velocity u and making an angle α with the horizontal, its time of flight will be given by :
(1) $\frac{2u\sin\alpha}{g}$ (2) $\frac{2u^2\sin\alpha}{g}$ (3) $\frac{u\sin\alpha}{g}$ (4) $\frac{u^2\sin^2\alpha}{g}$

53. Two balls are projected simultaneously with the same velocity from the top of tower, one vertically upwards and the other vertically downwards. If they reach the ground in times t_1 and t_2 respectively, then the height of tower is :
(1) $\frac{1}{2}g\,t_1\,t_2$ (2) $\frac{1}{2}g(t_1^2+t_2^2)$ (3) $\frac{1}{2}g(t_2^2-t_1^2)$ (4) $\frac{1}{2}g(t_1+t_2)^2$

54. Two particles A and B are dropped from the heights of 5 m and 20 m respectively. Then the ratio of time taken by A to that taken by B, to reach the ground is :
(1) 1 : 4 (2) 2 : 1 (3) 1 : 2 (4) 1 : 1

55. A train starts, from station A with uniform acceleration f_1 for some distance and then goes with uniform retardation f_2 for some more distance to come to rest at station B. The distance between the stations A and B is 4 km and the train takes 4 minutes to complete this journey. If f_1 and f_2 are in km - minute units, then
$\frac{1}{f_1}+\frac{1}{f_2}=$
(1) 1 (2) 2 (3) 3 (4) 4

56. A body is moving in a straight line with uniform acceleration. It covers distances 10 m and 12 m in third and fourth second respectively, then the initial velocity in m/sec is :
(1) 2 m/sec (2) 3 m/sec (3) 4 m/sec (4) 5 m/sec

57. If A, B, C are three forces in equilibrium acting at a point and if 60°, 150°, 150° respectively denote the angles between A and B , B and C and C and A, then the forces are in proportion of :
(1) $\sqrt{3}$: 1 : 1 (2) 1 : 1 : $\sqrt{3}$ (3) 1 : $\sqrt{3}$: 1 (4) 1 : 2.5 : 2.5

58. A horizontal rod AB is suspended at its ends by two vertical strings. The rod is of length 0.6 metre and weights 3 units. Its centre of gravity G is at a distance 0.4 metre from A. Then the tension of string at A, in same unit is :

(1) 0.2 (2) 0.8 (3) 1.4 (4) 1.0

59. If the forces 6 *W*, 5 *W* acting at a point (2, 3) in Cartesian rectangular co-ordinates are parallel to the positive x and y-axis respectively, then the moment of the resultant force about the origin is :

(1) 8 *W* (2) −3 *W* (3) 3 *W* (4) −8 *W*

60. Two like parallel forces P and Q act on a rigid body at A and B respectively. If P and Q be interchanged in position, show that the point of application of the resultant be displaced through a distance d along AB, where d :

(1) $\frac{P+Q}{P-Q}AB$ (2) $\frac{P-Q}{P+Q}AB$ (3) $\frac{2P+Q}{2P-Q}AB$ (4) $\frac{P-Q}{2P+Q}AB$

61. Three forces P, Q, R are acting at a point in a plane. The angle between P and Q, Q and R are 130° and 120° respectively, then for the equilibrium, forces P, Q, R are in the ratio :

(1) 1 : 2 : 3 (2) $1 : 2 : \sqrt{3}$

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

62. If the resultant of two forces of magnitudes P and 2P is perpendicular to P, then the angle between the forces is :

(1) $\frac{2\pi}{3}$ (2) $\frac{3\pi}{4}$ (3) $\frac{4\pi}{5}$ (4) $\frac{5\pi}{6}$

63. Inequations $3x - y \geq 3$ and $4x - y > 4$:

(1) have solution for positive x and y (2) have no solution for positive x and y

(3) have solution for all x (4) have solution for all y

64. Which of the terms is ***not*** used in a linear programming problem ?

(1) Slack variables (2) Objective function

(3) Concave region (4) Feasible solution

65. If the constraints in a L.P.P. are changed :

(1) The problem is to be re-evaluated

(2) The solution is not defined

(3) The objective function has to be modified

(4) The change in constrained is ignored

66. The point at which the maximum value of $(3x + 2y)$ subject to the constraints $x + y \leq 2, x \geq 0, y \geq 0$ is obtained :

(1) (0, 0) (2) (1.5, 1.5) (3) (2, 0) (4) (0, 2)

67. A binomial distribution tends to a normal distribution when frequency becomes :

(1) very large (2) very small (3) unity (4) zero

68. If r is the coefficient of correlation, then :

(1) $r \geq 1$ (2) $r \leq 1$ (3) $|r| \geq 1$ (4) $|r| \leq 1$

69. For a frequency distribution, the mean deviation about mean is computed by :

(1) M. D. $= \frac{\Sigma d_i}{\Sigma f_i}$ (2) M. D. $= \frac{\Sigma f_i d_i}{\Sigma f_i}$

(3) M. D. $= \frac{\Sigma f_i |d_i|}{\Sigma f_i}$ (4) M. D. $= \frac{\Sigma f_i}{\Sigma f_u |d_i|}$

70. Which of the following is ***not*** a measure of dispersion ?

(1) variance

(2) mean deviation

(3) standard-deviation

(4) mode

71. The mean of discrete observations :

$y_1, y_2, y_3, \ldots\ldots\ldots\ldots, y_n$ is given by :

(1) $\frac{\sum_{i=1}^{n} y_i}{n}$ (2) $\frac{\sum_{i=1}^{n} y_i}{\sum_{i=1}^{n} i}$ (3) $\frac{\sum_{i=1}^{n} y_i f_i}{n}$ (4) $\frac{\sum_{i=1}^{n} y_i f_i}{\sum_{i=1}^{n} f_i}$

72. The relationship between mean, median and mode for a moderately skewed distribution is :

(1) mode = median – 2 mean (2) mode = 2 median – mean

(3) mode = 3 median – 2 mean (4) mode = 2 median – 3 mean

73. Two cards are drawn one by one at random from a pack of 52 cards. The probability that both of them are king, is :

(1) $\frac{2}{13}$ (2) $\frac{1}{169}$ (3) $\frac{1}{221}$ (4) $\frac{30}{221}$

74. Two events A and B having probabilities 0.25 and 0.50 respectively. The probabilities that both A and B occur simultaneously is 0.14. Then the probability that neither A nor B occur is :

(1) 0.39 (2) 0.25 (3) 0.11 (4) 0.06

75. The angle of elevation of sun, when the shadow of the pole is $\sqrt{3}$ times the height of the pole is :

(1) 60° (2) 30° (3) 45° (4) 15°

76. The angle of elevation of the top of a tower at a point on the ground is 30°. If on walking 20 metres towards the tower the angle of elevation becomes 60°, then the height of the tower is :

(1) 20 metres (2) 10 metres

(3) $10\sqrt{3}$ metres (4) $\frac{10}{\sqrt{3}}$ metres

77. In a ΔABC, if $\frac{\cos A}{a}=\frac{\cos B}{b}=\frac{\cos C}{c}$ and the side $a = 2$, then the area of the triangle is :

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

78. The value of $\cos\left[\tan^{-1}\frac{1}{3}+\tan^{-1}\frac{1}{2}\right]$ is equal to :

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

79. If $\sin^2\theta-2\cos\theta+\frac{1}{4}=0$, then the general value of θ is :

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

80. The value of $\cos 15^\circ$ is equal to :

(1) $\pm\sqrt{\frac{1-\cos 30^\circ}{2}}$ (2) $\pm\sqrt{\frac{1+\cos 30^\circ}{2}}$ (3) $\sqrt{\frac{1-\cos 30^\circ}{2}}$ (4) $\sqrt{\frac{1+\cos 30^\circ}{2}}$

81. If $\vec{a}=-3\hat{i}+7\hat{j}+5\hat{k}$, $\vec{b}=-3\hat{i}+7\hat{j}-3\hat{k}$ and $\vec{c}=7\hat{i}-5\hat{j}-3\hat{k}$ are three coterminus edges of a parallelopiped, then its volume is :

(1) 108 (2) 210 (3) 272 (4) 308

82. A tetrahedron has vertices at O(0, 0, 0), $P(1, 2, 1)$, $Q(2, 1, 3)$ and $R(-1, 1, 2)$. Then the angle between the faces OPQ and POR will be :

(1) 30° (2) 90° (3) $\cos^{-1}\left(\frac{19}{35}\right)$ (4) $\cos^{-1}\left(\frac{71}{31}\right)$

83. If the vectors $\vec{a}, \vec{b}, \vec{c}$ from the sides BC, CA and AB respectively, of a triangle ABC, then :

(1) $\vec{a}.\vec{b}+\vec{b}.\vec{c}+\vec{c}.\vec{a}=0$ (2) $\vec{a}\times\vec{b}=\vec{b}\times\vec{c}=\vec{c}\times\vec{a}$

(3) $\vec{a}.\vec{b}=\vec{b}.\vec{c}=\vec{c}.\vec{a}$ (4) $\vec{a}\times\vec{b}+\vec{b}\times\vec{c}+\vec{c}\times\vec{a}=0$

84. If $\vec{a}+\vec{b}=\vec{b}\times\vec{c}\neq 0$, where $\vec{a}, \vec{b}$ and $\vec{c}$ are coplaner vectors, then for some scalar k :

(1) $\vec{a}+\vec{c}=k\vec{b}$ (2) $\vec{a}+\vec{b}=k\vec{c}$ (3) $\vec{b}+\vec{c}=k\vec{a}$ (4) $\vec{b}+\vec{c}=\frac{k}{\vec{a}}$

85. If $\vec{a}, \vec{b}, \vec{c}$ are the position vectors of the vertices A, B, C of the triangle ABC, then the centroid of triangle ABC is :

(1) $\frac{\vec{a}+\vec{b}+\vec{c}}{3}$ (2) $\frac{1}{2}\left(\vec{a}+\frac{\vec{b}+\vec{c}}{3}\right)$ (3) $\vec{a}+\frac{\vec{b}+\vec{c}}{2}$ (4) $\frac{\vec{a}+\vec{b}+\vec{c}}{2}$

86. The solution of the differential equation $x\log x\frac{dy}{dx}+y=2\log x$ is :

(1) $y=\log x+c$ (2) $y=\log x^2+c$

(3) $y\log x=(\log x)^2+c$ (4) $y=x\log x+c$

87. Solution of differential equation $2xy\frac{dy}{dx}=x^2+3y^2$ is :

(1) $x^3+y^2=ex^2$ (2) $\frac{x^2}{2}+\frac{y^3}{x}=y^2+c$ (3) $x^2+y^3=cx^2$ (4) $x^2+y^2=cx^3$

where c is a constant.

88. An integrating factor for the differential equation $(1+y^2)dx-(\tan^{-1}y-x)dy=0$, is :

(1) $\tan^{-1}y$ (2) $e^{\tan^{-1}y}$ (3) $\frac{1}{1+y^2}$ (4) $\frac{1}{x(1+y)}$

89. The solution of differential equation $\frac{dy}{dx}=\frac{y-x}{y+x}$ is :

(1) $\log_e\left(x^2+y^2\right)+2\tan^{-1}\frac{y}{x}+c=0$ (2) $\frac{y^2}{2}+y=xy-\frac{x^2}{2}+c$

(3) $\left(1+\frac{x}{y}\right)y=\left(1-\frac{x}{y}\right)x+c$ (4) $y=x-2\log_e y+c$

90. The solution of $\frac{dy}{dx}=e^x(\sin x+\cos x)$ is :

(1) $y=e^x(\sin x-\cos x)+c$ (2) $y=e^x(\cos x-\sin x)+c$

(3) $y=e^x\sin x+c$ (4) $y=e^x\cos x+c$

91. If r radius of the base, h height and α is semi-vertical angle of the cone, then its volume and surface are :

(1) $\pi r^2h\ ;\ \frac{1}{3}\pi h^2\tan\alpha\sec\alpha$ (2) $\frac{1}{3}\pi r^2h\ ;\ \pi h^2\tan\alpha\sec\alpha$

(3) $\frac{1}{2}\pi r^2h\ ;\ \frac{1}{2}\pi h^2\tan\alpha\sec\alpha$ (4) $\pi r^2h\ ;\ 2\pi h^2\tan\alpha\sec\alpha$

92. If r is the radius of a sphere, then its volume and surface are :

(1) $\frac{1}{3}\pi r^3;2\pi r^2$ (2) $\frac{2}{3}\pi r^3;3\pi r^2$ (3) $\frac{4}{3}\pi r^3;4\pi r^2$ (4) $\frac{3}{4}\pi r^3;3\pi r^2$

93. The value of $\int_0^{\pi/2}\log\sin x\,dx$ is equal to :

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

94. The value of $\int\frac{x-1}{(x-2)(x-3)}dx$ is equal to :

(1) $-\log(x-2)+2\log(x-3)$ (2) $\log(x-2)-2\log(x-3)$

(3) $-\log(x-2)+\log(x-3)$ (4) $\log(x-2)-\log(x-3)$

95. The value of $\int\frac{dx}{\cos^2x(1-\tan x)^2}$ is equal to :

(1) $\frac{1}{\tan x-1}+c$ (2) $\frac{1}{1-\tan x}+c$

(3) $-\frac{1}{3(1-\tan x)^3}+c$ (4) $-\frac{1}{5(1-\tan x)^5}+c$

96. If $\int x\sin x = -x\cos x + \alpha$, then α is :

(1) $\sin x + c$ (2) $\cos x + c$ (3) c (4) $\sin x \cos x$

97. The minimum value of $_e(2x^2 - 2x + 1)\sin^2 x$ is :

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

98. Let $f(x) = \frac{x^2 - 1}{x^2 + 1}$, for every real number x, then the minimum value of f :

(1) does not exist because f is unbounded
(2) is not attained even through f is bounded
(3) is equal to 1
(4) is equal to –1

99. The maximum value of $\frac{(5+x)(2+x)}{1+x}$ for non-negative real x is :

(1) 12 (2) 10 (3) 9 (4) 8

100. The maximum value of $f(\theta) = a \sin\theta + b \cos\theta$ is :

(1) $\frac{a}{b}$ (2) $\frac{a}{\sqrt{a^2 + b^2}}$ (3) $\sqrt{ab}$ (4) $\sqrt{a^2 + b^2}$

101. The normal to the curve $x = a(\cos\theta + \theta\sin\theta)$, $y = a(\sin\theta - \theta\cos\theta)$ at any point θ is such that it :

(1) passes through the origin
(2) is at constant distance from the origin
(3) makes a constant angle with the x-axis
(4) makes a constant angle with the y-axis

102. The equation of the normal to the curve $y(x-2)(x-3) - x + 7 = 0$ at the point where it cuts the axis of x is :

(1) $y = 4x - 144$ (2) $3x - 2y = 2$ (3) $y + 2x = 140$ (4) $y - 2x = 144$

103. The straight line $\frac{x}{a} + \frac{y}{b} = 1$ touches the curve $y = be^{-x/a}$ at the point :

(1) Where it crosses the x-axis (2) Where it crosses the y-axis
(3) (0, 0) (4) (1, 1)

104. The tangent line is perpendicular to the x-axis to the curve $x=t^2-1, y=t^3-t$, at the point :

(1) $t=-\frac{1}{\sqrt{3}}$ (2) $t=0$ (3) $t=\frac{1}{\sqrt{3}}$ (4) ∞

105. If $y=\sqrt{\frac{1+\tan x}{1-\tan x}}$, then $\frac{dy}{dx}$ is equal to :

(1) $\frac{1}{2}\sqrt{\frac{1-\tan x}{1+\tan x}}\sec^2\left(\frac{\pi}{4}+x\right)$ (2) $\sqrt{\frac{1-\tan x}{1+\tan x}}\sec^2\left(\frac{\pi}{4}+x\right)$

(3) $\frac{1}{2}\sqrt{\frac{1-\tan x}{1+\tan x}}\sec\left(\frac{\pi}{4}+x\right)$ (4) $\sqrt{\frac{1-\tan x}{1+\tan x}}\sec\left(\frac{\pi}{4}+x\right)$

106. The value of $\frac{d}{dx}[\log(\log x)]$ is equal to :

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

107. The function $f(x)=\frac{x-1}{1+e^{1/(x-1)}}, x\neq 0$ is continuous for $x=1$ when $f(1)$ equals :

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

108. Find the limit of the function $\frac{\tan x-\sin x}{\sin^3 x}$ as $x\to 0$:

(1) 0 (2) $\frac{1}{2}$ (3) 1 (4) ∞

109. The value of $\lim_{x\to\alpha}\frac{x^n-\alpha^n}{x-\alpha}$ is equal to :

(1) 0 (2) 1 (3) $\log\alpha$ (4) $n\alpha^{n-1}$

110. The locus of the pole of normal chords of hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ is :

(1) $\frac{a^2}{x^2}-\frac{b^2}{y^2}=\left(a^2-b^2\right)^2$ (2) $\frac{a^4}{x^2}-\frac{b^4}{y^2}=\left(a^2-b^2\right)$

(3) $\frac{a^6}{x^2}-\frac{b^6}{y^2}=\left(a^2+b^2\right)^2$ (4) $\frac{a^4}{x^2}-\frac{b^4}{y^2}=a^2+b^2$

111. If the line $lx+my=n$ touches the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ if :

(1) $al+bm=n$ (2) $a^2l^2+b^2m^2=n^2$

(3) $al-bm=n$ (4) $a^2l^2-b^2m^2=n^2$

112. The straight line $x\cos\alpha+y\sin\alpha=p$ touches the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ if :

(1) $p^2=a^2\sin^2\alpha-b^2\cos^2\alpha$ (2) $p^2=a^2\sin^2\alpha+b^2\cos^2\alpha$

(3) $p^2=a^2\cos^2\alpha-b^2\sin^2\alpha$ (4) $p^2=a^2\cos^2\alpha+b^2\sin^2\alpha$

113. The locus of the middle points of chords of ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, which are drawn through the positive end of the minor axis is :

(1) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{x}{a}$ (2) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{y}{b}$ (3) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{x}{b}$ (4) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{y}{a}$

114. The focal distance of any point $P(x_1, y_1)$ on the parabola $y^2=4ax$ is equal to :

(1) x_1+y_1 (2) $x_1.y_1$ (3) ax_1 (4) $a+x_1$

115. The vertex of the parabola $y^2-4y-2x-8=0$ is at the point :

(1) (–6, 2) (2) $\left(-\frac{11}{2},2\right)$ (3) $\left(\frac{1}{2},0\right)$ (4) $\left(-\frac{13}{2},2\right)$

116. The line, represented by the equation $ax^2+2hxy+by^2+2gx+2fy+c=0$ will be equidistance from the origin, if :

(1) $f^2+g^2=c(b-a)$ (2) $f^4+g^2=c\left(bf^2+ag^2\right)$

(3) $f^4-g^4=c\left(bf^2-ag^2\right)$ (4) $f^2+g^2=af^2+bg^2$

117. If $\lambda x^2-10xy+12y^2+5x-16y-3=0$ represents a pair of straight line, then λ is :

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

118. The equation of circle in the first quadrant touching each coordinate axis at a distance of one unit from the origin is :

(1) $x^2+y^2-2x-2y+1=0$ (2) $x^2+y^2-2x-2y-1=0$

(3) $x^2+y^2-2x-2y=0$ (4) $x^2+y^2+2x+2y=0$

119. If a circle whose centre is (1, –3) touch the line $3x-4y=5$, then the radius of the circle is :

(1) 2 (2) 4 (3) $\frac{5}{2}$ (4) $\frac{7}{2}$

120. If $\frac{1}{ab'}+\frac{1}{ba'}=0$, then the lines $\frac{x}{a}+\frac{y}{b}=1$ and $\frac{x}{b'}+\frac{y}{a'}=1$ are :

(1) Parallel (2) Inclined at 60° to each other

(3) Perpendicular to each other (4) Inclined at 30° to each other

121. If $D(2, 1)$, $E(-1, -2)$ and $F(3, 3)$ are mid-points of the sides BC, CA and AB of the triangle ABC, then the equation of AB is :

(1) $x+y=6$ (2) $3x+y=12$ (3) $x+y=0$ (4) $x-y=0$

122. The distance of the middle point of the line joining the points $(a \sin \theta, 0)$ and $(0, a \cos \theta)$ from the origin is :

(1) $\frac{a}{2}$ (2) $\frac{1}{2}a(\sin \theta + \cos \theta)$

(3) $a(\sin \theta + \cos \theta)$ (4) a

123. If the vertices of a quadrilateral are $A(0, 0)$, $B(3, 4)$, $C(7, 7)$, and $D(4, 3)$, then the quadrilateral $ABCD$ is :

(1) Parallelogram (2) Rectangle (3) Square (4) Rhombus

124. Two points A and B have the co-ordinates $(1, 0)$ and $(-1, 0)$ respectively and O is a point which satisfies the relation $AO - BO = \pm 1$, then the locus of O is :

(1) $12x^2+4y^2=3$ (2) $12x^2-4y^2=3$

(3) $12x^2+4y^2+3=0$ (4) $12x^2-4y^2+3=0$

125. Let $A=\{a, b, c\}$ and $B=\{1,2\}$. Consider a relation from set A to set B. Then R is subset of :

(1) A (2) B (3) $A \times B$ (4) $B \times A$

126. In a class of 100 students, 55 students have passed in Mathematics and 67 students have passed in Physics. Then the number of students who have passed in Physics only is :

(1) 22 (2) 33 (3) 10 (4) 45

127. The number of non-empty subsets of $\{1, 2, 3, 4\}$ is :

(1) 14 (2) 15 (3) 16 (4) 17

128. Two finite sets having m and n elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set. The values of m and n are :

(1) 7, 6 (2) 6, 3 (3) 5, 1 (4) 8, 7

129. Suppose $A_1, A_2, A_3, \cdots, A_{30}$ are thirty sets each having 5 elements and $B_1, B_2, B_3, \cdots, B_n$ are n sets each having 3 elements, let $\bigcup_{i=1}^{30} A_i - \bigcup_{j=1}^{n} B_j = s$ and each element of s belongs to exactly 10 of A_i's and exactly 9 of B_j's Then n is equal to :

(1) 15 (2) 3 (3) 45 (4) 60

130. Let $A = \{x: x \text{ is a multiple of } 3\}$ and $B = \{x: x \text{ is a multiple of } 5\}$. Then $A \cap B$ is given by :

(1) $\{3, 6, 9, \cdots\}$ (2) $\{5, 10, 15, 20, \cdots\}$

(3) $\{15, 30, 45, \cdots\}$ (4) ϕ

131. If $2x+3y-5z=7$, $x+y+z=6$, $3x-4y+2z=1$, then x is equal to :

(1) $\begin{vmatrix} 2 & -5 & 7 \\ 1 & 1 & 6 \\ 3 & 2 & 1 \end{vmatrix} \div \begin{vmatrix} 7 & 3 & -5 \\ 6 & 1 & 1 \\ 1 & -4 & 2 \end{vmatrix}$ (2) $\begin{vmatrix} -7 & 3 & -5 \\ -6 & 1 & 1 \\ -1 & -4 & 2 \end{vmatrix} \div \begin{vmatrix} 2 & 3 & -5 \\ 1 & 1 & 1 \\ 3 & -4 & 2 \end{vmatrix}$

(3) $\begin{vmatrix} 7 & 3 & -5 \\ 6 & 1 & 1 \\ 1 & -4 & 2 \end{vmatrix} \div \begin{vmatrix} 2 & 3 & -5 \\ 1 & 1 & 1 \\ 3 & -4 & 2 \end{vmatrix}$ (4) $\begin{vmatrix} -5 & 2 & 7 \\ 1 & 6 & 1 \\ 3 & 2 & 1 \end{vmatrix} \div \begin{vmatrix} 7 & 3 & 5 \\ 6 & 1 & 1 \\ 1 & 4 & -2 \end{vmatrix}$

132. If A is a singular matrix, then $Adj\ A$ is :

(1) Symmetric (2) Singular (3) Non-singular (4) Not defined

133. The value of the determinant

$$\begin{vmatrix} x+1 & x+2 & x+4 \\ x+3 & x+5 & x+8 \\ x+7 & x+10 & x+14 \end{vmatrix} \text{ is :}$$

(1) 2 (2) x^2+2 (3) -2 (4) x^2-1

134. If ${}^{15}C_{3r} = {}^{15}C_{r+3}$, then r is equal to :

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

135. The value of ${}^{n}P_r$ is equal to :

(1) ${}^{n-1}P_r + r.\ {}^{n-1}P_{r-1}$ (2) $n \cdot {}^{n-1}P_r + {}^{n-1}P_{r-1}$

(3) $n\left({}^{n-1}P_r + {}^{n-1}P_{r-1}\right)$ (4) ${}^{n-1}P_{r-1} + {}^{n-1}P_r$

136. Given positive integers $r > 1$ and $n > 2$ and that co-efficients of $(3r)^{th}$ and $(r+2)^{th}$ terms in the binomial expansion of $(1+x)^{2n}$ are equal, then :

(1) $n = 2r$ (2) $n = 3r$ (3) $n = 2r+1$ (4) $n = 2r-1$

137. If the A. M. and G. M. of the roots of a quadratic equation in x are p and q respectively, then its equation is :

(1) $x^2 - 2px + q^2 = 0$ (2) $x^2 + 2px + q^2 = 0$

(3) $x^2 - px + q = 0$ (4) $x^2 - 2px + q = 0$

138. A G. P. consists of an even number of terms. If the sum of all the terms is 5 times the sum of the terms occupying odd places, the common ratio will be :

(1) 2 (2) 3 (3) 4 (4) 5

139. If G be the Geometric Mean of x and y, then $\frac{1}{G^2 - x^2} + \frac{1}{G^2 - y^2}$ is equal to :

(1) G^2 (2) $\frac{1}{G^2}$ (3) $\frac{2}{G^2}$ (4) $3G^2$

140. If the 10th term of a G. P. is 9 and 4th term is 4, then its 7th term is :

(1) 6 (2) 36 (3) $\frac{4}{9}$ (4) $\frac{9}{4}$

141. If A_1, A_2 be two arithmetic means between $\frac{1}{3}$ and $\frac{1}{24}$, then their values are :

(1) $\frac{7}{72}, \frac{5}{36}$ (2) $\frac{17}{72}, \frac{5}{36}$ (3) $\frac{7}{36}, \frac{5}{72}$ (4) $\frac{5}{72}, \frac{17}{72}$

142. If nth term of an A. P., be $(2n-1)$, then the sum of first n terms will be :

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

143. The sum of first n natural numbers is :

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

144. Series $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \cdots + \frac{1}{n(n+1)}$ is equal to :

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

145. If $i = \sqrt{-1}$, then $4 + 5\left(-\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{334} + 3\left(-\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{365}$ is equal to :

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

146. If z_1 and z_2 are two complex numbers (non-zero) such that $|z_1 + z_2| = |z_1| + |z_2|$, then $Arg\ z_1 - Arg\ z_2$ is equal to :

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

147. If z_1, z_2, z_3, z_4 are the vertices of a square in that order, then :

(1) $|z_1 - z_3| = |z_2 - z_4|$ (2) $|z_1 - z_3| = |z_1 - z_4|$

(3) $|z_2 - z_3| = |z_1 - z_3|$ (4) $|z_1 - z_2| = |z_2 - z_4|$

148. The set of values of p for which the roots of the equation $3x^2 + 2x + p\,(p-1) = 0$ are of opposite signs is :

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

149. The equation $x - \frac{2}{x-1} = 1 - \frac{2}{x-1}$ has :

(1) no root (2) one root

(3) two equal roots (4) infinitely many roots

150. If a root of the equation $x^2 + px + q = 0$ and $x^2 + \alpha x + \beta = 0$ is common, then its value will be (where $p \neq \alpha$ and $q \neq \beta$) :

(1) $\frac{q-\beta}{\alpha-p}$ (2) $\frac{p\beta-\alpha q}{q-\beta}$

(3) $\frac{\alpha-\beta}{q-p}$ (4) $\frac{q-\beta}{\alpha-p}$ or $\frac{p\beta-\alpha q}{q-\beta}$

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 ले कि प्रश्नपत्र में सभी पृष्ठ मौजूद है 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 एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न-पुस्तिका पर अनुक्रमांक संख्या और ओ० एम० 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 लिये 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 लिये केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह 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 सम्बन्धित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. रफ कार्य के लिये इस पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा अंतिम खाली पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त ***प्रश्न-पुस्तिका एवं 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/होगी।

1- 03 (Three) marks to be awarded for each correct answer.
2- 01 (One) mark to be deducted for each incorrect answer.
3- 00 (zero) mark to be awarded for each unattempted question.

KEY OF UET/PET-2010

M.C.A.

(492)

Set- II

Q.	A.
1	2
2	3
3	3
4	2
5	2
6	4
7	3
8	1
9	3
10	4
11	3
12	2
13	1
14	4
15	3
16	1
17	1
18	4
19	3
20	4

Q.	A.
21	4
22	2
23	3
24	4
25	2
26	4
27	3
28	2
29	1
30	4
31	3
32	4
33	3
34	3
35	2
36	3
37	3
38	2
39	2
40	4

Q.	A.
41	3
42	2
43	4
44	3
45	2
46	4
47	3
48	1
49	3
50	2
51	4
52	1
53	1
54	3
55	2
56	4
57	2
58	1
59	4
60	2

Q.	A.
61	4
62	1
63	1
64	3
65	1
66	3
67	1
68	4
69	3
70	4
71	1
72	3
73	3
74	1
75	2
76	3
77	4
78	1
79	2
80	4

Q.	A.
81	3
82	3
83	2
84	1
85	1
86	3
87	4
88	2
89	1
90	3
91	2
92	3
93	4
94	1
95	2
96	1
97	3
98	4
99	3
100	4

Q.	A.
101	2
102	3
103	1
104	2
105	1
106	1
107	1
108	2
109	4
110	3
111	4
112	4
113	2
114	4
115	1
116	3
117	3
118	1
119	1
120	3

Q.	A.
121	4
122	1
123	4
124	2
125	3
126	4
127	2
128	2
129	3
130	3
131	3
132	2
133	3
134	4
135	1
136	1
137	1
138	3
139	2
140	1

Q.	A.
141	2
142	3
143	4
144	2
145	3
146	3
147	1
148	2
149	1
150	4
151	
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Q.	A.
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Q.	A.
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