

New

Set No. 1

M.C.A Code No

492

02815

Question Booklet No.

16P/203/14/2(i)

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

Roll No.

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Serial No. of OMR Answer Sheet

2016

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 30 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 : 48

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



16P/203/14/2(i)

ROUGH WORK

रफ़ कार्य

16P/203/14/2(i)

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.

01. If in certain code EDUCATION is written as FEVDBUJPO, then how UNIVERSITY would be written in the same code ?

(1) VOJWFSSIUZ

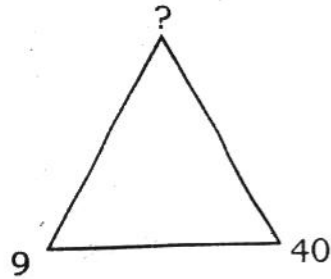
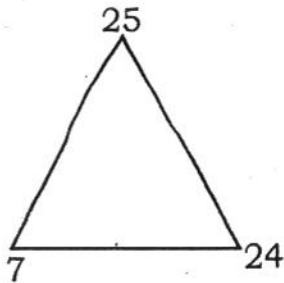
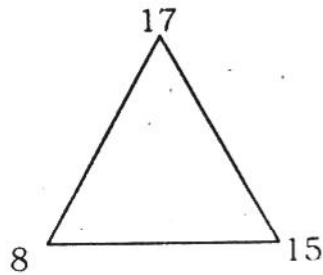
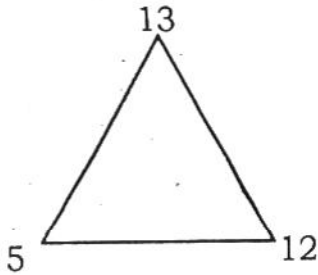
(2) VOJWESTIUZ

(3) VOJWFSTJUZ

(4) VOJWFSTJUY

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02. Find the number in the position of '?'



(1) 40

(2) 41

(3) 42

(4) 43

03. In this multiplication question the five letters represent five different digits. What are the actual figures? There is no zero.

TFBN

U

NFBUT

(1) N=3, F=9, B=7, U=4, T=8

(2) N=3, F=9, B=7, U=8, T=4

(3) N=4, F=3, B=9, U=7, T=8

(4) N=4, F=9, B=3, U=7, T=8

04. Choose out the odd one :

- | | |
|-----------|-------------|
| (1) Arrow | (2) Missile |
| (3) Sword | (4) Spear |

05. Orthopedist is related to Bones in the same way as Chiropodist is related to

- | | |
|-----------|------------|
| (1) Nails | (2) Sounds |
| (3) Feet | (4) Heart |

06. Which term comes next in the series : YEB, WFD, UHG, SKI, ?

- | | |
|---------|---------|
| (1) TOL | (2) SKI |
| (3) SLH | (4) QOL |

07. A father is seven times the age of his son. After 3 years, the father's age will be five times the age of his son. Find the present age of the father.

- | | | | |
|--------|--------|--------|--------|
| (1) 21 | (2) 28 | (3) 35 | (4) 42 |
|--------|--------|--------|--------|

08. A water tank can be filled by taps 'A' and 'B' in 18 minutes and 27 minutes respectively. A third tap 'C' can empty this tank completely in 13.5 minutes. If all the three taps are turned on at the same time find the time taken to fill the water tank.

- | | |
|----------------|----------------|
| (1) 18 minutes | (2) 42 minutes |
| (3) 27 minutes | (4) 54 minutes |

12. Election is to Manifesto as Meeting is to

- (1) Circular (2) Agenda
(3) Report (4) Preface

13. Ashish went to the post office to buy five-rupee, two-rupee and one-rupee stamps. He paid the clerk Rs. 20, and since the clerk had no change, he gave Ashish three more one-rupee stamps. If the number of stamps of each type that Ashish had ordered initially was more than one, what was the total number of stamps that he bought ?

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

14. What is the smallest fraction which must be subtracted from the sum of $2\frac{3}{4}$, $1\frac{1}{2}$, $2\frac{7}{12}$, $5\frac{1}{4}$ and $3\frac{1}{3}$ to make the result a whole number ?

- (1) $\frac{5}{12}$ (2) $\frac{7}{12}$
(3) $\frac{1}{2}$ (4) 7

15. In the sequence given below, which element is the seventh to the right of the eighteenth element from the right end ?

X 2 S % 5 K F # 8 N U 3 J O C I 4 B \$ O G R 6 E H 7 V T Q

- (1) B (2) F
(3) \$ (4) #

16. Hydroponics is used to grow plants in water that contains nutrients.

Sourav has a hydroponic vegetable garden with four levels.

Onions are growing immediately above tomatoes.

Capsicums are immediately below chillies.

Potatoes are immediately below tomatoes.

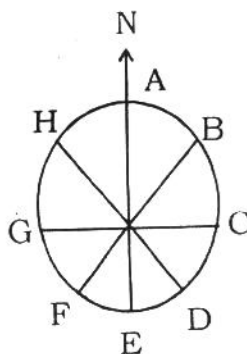
Only one level has two vegetables growing on it.

Which two vegetables are growing on the same level ?

- (1) Onions and chillies (2) Potatoes and chillies
(3) Tomatoes and chillies (4) Potatoes and capsicums

17. Eight people A, B, C, D, E, F, G and H are seated as shown in the diagram. All are facing in the outward direction, with their backs towards the centre. If all of them move anticlockwise to three places, then

- (1) A is facing south (2) B is facing west
(3) E is facing east (4) H is facing north-west



18. A milkman saves milk in two vessels, one cuboidal and the other a cylindrical one. The capacity of the cuboidal vessel is 20 liters more than the cylindrical one. When 30 liters of milk is drawn from each of the two full vessels, the amount left in the cuboidal vessel is twice that left in the cylindrical vessel. The capacity (in liters) of the cuboidal vessel is :

- (1) 30 (2) 50 (3) 70 (4) 130

19. Study the following table :

LUNCHEON SPECIALS

MEAL	PRICE
Hamburger	\$ 2.75
Pizza	\$ 2.25
Chicken	\$ 3.00
Pasta Salad	\$ 1.50
Fish	\$ 2.50

The above table refers to the luncheon prices at a certain cafeteria.

What is the average price for a meal at this cafeteria ?

- (1) \$ 2.40 (2) \$ 2.50 (3) \$ 2.60 (4) \$ 2.75

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20. The table given below shows the survey carried out at a railway station for the arrivals/departures of trains for a certain month.

Delay (in min)	Number of arrivals	Number of departures
0	1250	1400
0-30	114	82
30-60	31	5
Over 60	5	3
Total	1400	1490

If the punctuality of railways is defined as the number of occasions on which trains arrived or departed in time expressed as a percentage of total number of arrivals and departures from the station then the punctuality for the month under observation is :

- (1) 75 % (2) 89.2% (3) 91.7% (4) 94.3%

21. Prerna is Chetna's sister. Sandhya is Chetna's mother. Jagdish is Sandhya's father. Leela is Jagdish's mother. How Prerna related to Leela ?

- (1) Daughter (2) Grand daughter
(3) Grand grand daughter (4) Daughter-in-law

22. The temple is 1 mile away from the Post-Office in north. The Bank is in east of the Post-Office at 1 mile. School is 1 mile away in south from the Bank. In which direction from the Post-Office the School is located ?

- (1) East (2) East-South
(3) North (4) South

23. Thirty men take 20 days to complete a job working 9 hours a day. How many hours should 40 men work to complete that job in 20 days ?
- (1) 7 hours, 30 mts. (2) 8 hours
(3) 8 hours, 30 mts. (4) 9 hours
24. 'A' possesses money more than 'B' but less than 'C'. 'D' possesses less than 'E' but more than 'A'. If 'C' has money less than 'D'. Who is richest of all ?
- (1) E (2) D (3) C (4) B
25. Ram starts from his home and walk 2 km. towards west turns right and walk 2 km, then turns right again and walks. What is the direction he is now facing from his home ?
- (1) East (2) West (3) South (4) North
26. If 10% of 20% of 'A' is 50, what is the value of 'A' ?
- (1) 150 (2) 250 (3) 500 (4) 2500
27. Population of a village is 600, in which 40% are adult male, 35% are female and rest of them are children. How many children are there in the village ?
- (1) 100 (2) 125 (3) 150 (4) 200

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28. Of the six members of a panel sitting in a row, A is to the left of D, but on the right of E. C is on the right of X, but is on the left of B. Who is to the left of F ? Which two members are sitting right in the middle ?

- | | |
|-------------|-------------|
| (1) A and C | (2) C and B |
| (3) D and B | (4) D and C |

29. Age of Sunil is equal to that of Sushil as they are twins. Praveen is younger than Satish. Prerna is younger to Gaurav but elder to Chetna. Who is the eldest of all ?

- | | |
|------------|-------------|
| (1) Sunil | (2) Praveen |
| (3) Satish | (4) Sushil |

30. A, B, C and D are playing cards. A and B are partners. D faces towards North. If A faces towards West, then who faces towards South ?

- | | |
|-------|---------------------|
| (1) B | (2) C |
| (3) D | (4) Data inadequate |

31. Forty boys are standing in a row facing the North. Amit is eleventh from the left and Deepak is thirty-first from the right end of the row. How far will Shreya, who is third to the right of Amit in the row, be from Deepak ?

- | | | | |
|---------------------|---------------------|---------------------|---------------------|
| (1) 2 nd | (2) 3 rd | (3) 4 th | (4) 5 th |
|---------------------|---------------------|---------------------|---------------------|

32. In a queue, A is eighteenth from the front while B is sixteenth from the back. If C is twentyfifth from the front and is exactly in the middle of A and B, then how many persons are there in the queue ?

- (1) 45 (2) 46 (3) 47 (4) 48

33. Which one of the following sets of letters is different from other three ?

- (1) ACEGI (2) BDFHJ
(3) LJNPR (4) SUWYA

34. A bus for Delhi leaves every thirty minutes from a bus stand. An enquiry clerk told a passenger that the bus had already left ten *minutes ago* and the next bus will leave at 9.35 am. At what time did the enquiry clerk give this information to the passenger ?

- (1) 8.55 am. (2) 9.08 am.
(3) 9.05 am. (4) 9.15 am.

35. What will be the next term in the following series ?

BKS, DJT, FIU, HHV,

- (1) JGW (2) IJK (3) IGU (4) JWK

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36. Reaching the place of meeting 20 minutes before 8.50 hrs. Sumit found himself thirty minutes earlier than the man who came 40 minutes late. What was the scheduled time of the meeting ?

- (1) 8.00 (2) 8.05 (3) 8.10 (4) 8.20

37. Find out the missing number in the following series ?

3, 15, 35, ?, 99, 143

- (1) 63 (2) 69 (3) 81 (4) 85

38. What is the missing number (?) in the following table ?

2	3	5
17	12	8
23	?	38

- (1) 25 (2) 32 (3) 27 (4) 30

39. Two numbers are in the ratio of 5:6. If 8 is subtracted from them, they become in the ratio of 4:5. The numbers are :

- (1) 40, 48 (2) 15, 16
(3) 25, 30 (4) 15, 18

40. Which number will come next in the following series ?

3, 8, 5, 7, 8, 5, 12, ?

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

Direction : 41-45 three of the following four are alike a certain way and so form a group. Which is the **one** that does not belong to the group ?

41. (1) Potato (2) Wheat
(3) Paddy (4) Barley

42. (1) Bread (2) Wool
(3) Cotton (4) Jute

43. (1) Bullock (2) Goat
(3) Sheep (4) Cow

44. (1) Tractor (2) Truck
(3) Generator (4) Cultivator

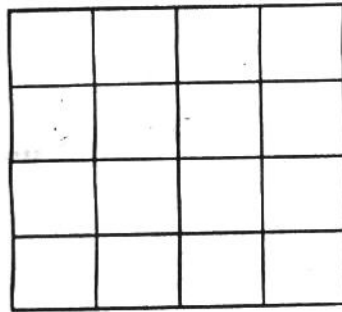
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45. (1) ICAR (2) RBI
(3) RRB (4) NABARD

46. Irrigation : Yield ::

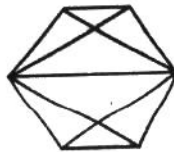
- (1) Milk : Cow (2) Diesel : Tractor
(3) Nitrogen : Plant Growth (4) Farmer : Field

47. Count the number of squares in the given figure :



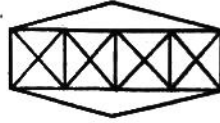
- (1) 32 (2) 30 (3) 29 (4) 28

48. Find the number of quadrilaterals in the given figure.



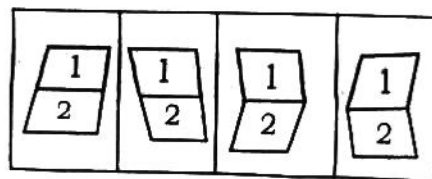
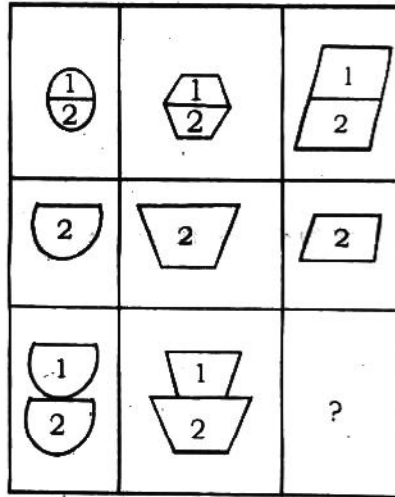
- (1) 6 (2) 7 (3) 9 (4) 11

49. Count the number of triangles and squares in the given figure.



- (1) 36 triangles, 7 squares (2) 38 triangles, 9 squares
 (3) 40 triangles, 7 squares (4) 42 triangles, 9 squares

50. Select a suitable figure from the four alternatives that would complete the figure matrix.



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

(1) 1

(2) 2

(3) 3

(4) 4

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51. If the resultant of two forces P and $2P$ is perpendicular to P , then angle between them is :

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

52. If the square of the resultant of two equal forces acting at a particle is thrice of their product, then angle between these forces is :

- (1) 45° (2) 60° (3) 90° (4) 120°

53. The resolved part of a force of 16 Newtons in a direction is $8\sqrt{3}$ Newtons. The inclination of the direction of the resolved part with the direction of the force is :

- (1) 30° (2) 60° (3) 120° (4) 150°

54. If the resultant of two forces P and Q acting at a point is $Q\sqrt{3}$ and makes 30° angle with P , then :

- (1) $P = Q$ (2) $P = 3Q$
(3) $2P = Q$ (4) $P = Q$ or $P = 2Q$

55. Forces 5, 3, 4 and 6 kg wts are acting along sides CB , BA , DA and DB respectively of a square $ABCD$. If each side of the square equal to 2m, then the algebraic sum of the moments of these forces about point C is :

- (1) 0 (2) $1+3\sqrt{2}$
(3) $2+6\sqrt{2}$ (4) $4\sqrt{2}$

56. A particle is attached to three points A, B, and C by forces equal to \vec{PA} , \vec{PB} , \vec{PC} respectively such that their resultant is λPG , where G is the centroid of ΔABC , then $\lambda =$
- (1) 1 (2) 2 (3) 3 (4) 4
57. A force F is resolved into two components forces P and Q. If P and Q are equally inclined to F then :
- (1) $P = Q$ (2) $P = 2Q$
- (3) $2P = Q$ (4) $P = \frac{Q}{2}$
58. Three equal forces of 10 N are acting on a particle. If their lines of action make equal angles with one another then their resultant is :
- (1) $5\sqrt{2}$ N (2) 20 N (3) 30 N (4) 0
59. Three forces 7N, 5N and 3N acting on a particle are in equilibrium ,then angle between forces 5N and 3N is :
- (1) 30° (2) 60° (3) 90° (4) 120°
60. A force of $\sqrt{5}$ unit is acting along the line $\frac{x-3}{2} = \frac{y-4}{-1}$ the moments of this force about point (4, 1) along Z-axis is :
- (1) 5 (2) $-\sqrt{5}$ (3) $\sqrt{5}$ (4) 0

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61. A hockey stick pushes a ball at rest for 0.01 sec. with an average force of 50N. If the ball weights 0.2 kg, then the velocity of the ball just after being pushed is :

- (1) 3.5 m/sec. (2) 2.5 m/sec.
(3) 1.5 m/sec. (4) 4.5 m/sec.

62. A man falls vertically under gravity with a box of mass 'm' on his head. Then the reaction force between his head and the box is :

- (1) 3 mg (2) 2 mg
(3) 0 mg (4) 1.5 mg

63. A cricket ball of mass 200 grams moving with a velocity of 20 meter/sec. is brought to rest by a player in 0.1sec. The average force applied by the player is :

- (1) 4×10^3 dynes (2) 4×10^4 dynes
(3) 4×10^5 dynes (4) 4×10^6 dynes

64. A bullet fired into a target loses half of its velocity after penetrating 3 cm. It will further penetrate a distance before coming to rest is :

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

65. An engine and train weights 420 tons and the engine exerts a force of 7 tons. If the resistance to motion be 14 lbs wt per ton, then the time, the train will take to acquire a velocity of 30 m/hr from rest is :

- (1) 2.2 min (2) 2.6 min
 (3) 2.8 min (4) 3 min

66. If masses 15 and 10 hang on the ends of a string which passes over a smooth pully, then the common acceleration of the 2 masses is :

- (1) $\frac{g}{10}$ (2) $\frac{g}{5}$ (3) $\frac{g}{4}$ (4) $\frac{g}{3}$

67. If h_1 and h_2 are the greatest heights for the two paths of a projectile with a given horizontal range R then :

- (1) $R = 4\sqrt{h_1 h_2}$ (2) $R = \sqrt{h_1 h_2}$
 (3) $R = \sqrt{\frac{h_1}{h_2}}$ (4) $R = 2\sqrt{h_1 h_2}$

68. A ball projected at an angle α . Its range will be maximum at an angle :

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

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69. A particle is projected from a point O with velocity u at an angle of 60° with the horizontal. When it is moving in a direction at right angle to its direction of O, its velocity then is given by :

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

70. Minimize $f = 3x + y$ under the constraints $x \geq 0, y \geq 0, 7x + 5y \geq 35$ and $x + 2y \geq 9$. The minimum value is :

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

71. A small factory makes tables and cots with metal. It can not sell more than 5 tables or 3 cots per day. A table is made in 2 hours while a cot takes 4 hours for manufacture. The factory works for 16 hours a day. The quantity of metal available per day was enough only for 6 items. The profit on a table was Rs. 100 and for a cot it was Rs. 150. The number of tables and cots should be made per day for getting maximum profit :

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

72. The system of parallel lines given by the various values of the objective function are called :

- | | |
|------------------|------------------------|
| (1) Profit lines | (2) Iso profit lines |
| (3) Axes | (4) Intersecting lines |

73. Two kinds of ghee X and Y are mixed to make a mixture of ghee. Each mixture weight 9 kg. At least 5 kg of X and no more than 5 kg of Y are mixed. There is a profit of Rs. 12 on X and Rs 18 on Y per kg. The quantity of X and Y mixed for getting maximum profit are :

- (1) 5 kg of X mixed with 4 kg of Y
- (2) 4 kg of X mixed with 5 kg of Y
- (3) 4 kg of X mixed with 4 kg of Y
- (4) 5 kg of X mixed with 5 kg of Y

74. The mean marks of 100 students were found to be 40. Later on it was discovered that a score of 53 was misread as 83. The corrected mean corresponding to the corrected score is :

- | | |
|----------|----------|
| (1) 37.5 | (2) 35.6 |
| (3) 39.7 | (4) 38.7 |

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75. The median of the variables

$X+4, x-\frac{7}{2}, x-\frac{5}{2}, x-3, x-2, x+\frac{1}{2}, x-\frac{1}{2}, x+5$ ($x>0$) is :

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

76. The algebraic sum of deviations of 10 observations about 15 is 70.

The mean is :

- (1) 22 (2) 25 (3) 20 (4) 30

77. The mean of five observations is 44 and the variance is 8.24. Three of the five observations are 1, 2 and 6. The remaining two are :

- (1) 9, 4 (2) 7, 6 (3) 6, 5 (4) 10, 3

78. Karl Pearsons coefficient of Skewness of a distribution is 0.32. Its S.D. is 6.5 and mean is 29.6. The mode and median of the distribution are :

- (1) 27.52, 28.91 (2) 26.92, 27.23
(3) 25.67, 26.34 (4) 26.34, 25.67

79. Six boys and six girls sit in a row randomly. The probability that the six girls sit together is :

- (1) $\frac{1}{36}$ (2) $\frac{1}{12}$ (3) $\frac{1}{132}$ (4) $\frac{5}{36}$

80. Twenty people sit around at random at a round table. The probability that two people A, B sit with four people between them :

- (1) $\frac{1}{20}$ (2) $\frac{2}{19}$ (3) $\frac{3}{20}$ (4) $\frac{1}{10}$

81. A problem in mathematics is given to three students whose chances of solving it are respectively $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$. The probability that the problem will be solved :

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

82. A candidate is selected for interview for three posts. For the first there are 3 candidates, for the second there are 4 candidates and for the third there are 2. The chances of his getting at least one post is :

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

83. A coin is tossed n times. The chance that the head will present itself an odd number of times is :

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

84. The simplified value of

$\cos A \cos 2A \cos 4A \cos 8A \dots \cos 2^{n-1}A$ is :

- (1) $\frac{1}{2^n \sin A} \sin 2^n A$ (2) $\frac{1}{2^n \sin A} \cos 2^n A$
 (3) $\frac{1}{2^n \cos A} \sin 2^n A$ (4) $\frac{1}{2^n \cos A} \cos 2^n A$

85. The greatest value of the expression $a \sin \theta + b \cos \theta$ is :

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

86. The value of $\sin^3 10^\circ + \sin^3 50^\circ - \sin^3 70^\circ$ is :

- (1) $-\frac{3}{2}$ (2) $\frac{3}{4}$ (3) $-\frac{3}{4}$ (4) $-\frac{3}{8}$

87. The minimum value of $\tan B \tan C$ in an acute angled triangle ABC

is :

- (1) $\tan \frac{A}{2}$ (2) $\cot \frac{A}{2}$
 (3) $\operatorname{cosec}^2 \frac{A}{2}$ (4) $\cot^2 \frac{A}{2}$

88. The value of $\sin \frac{\pi}{14} \sin \frac{3\pi}{14} \sin \frac{5\pi}{14}$ is :

- (1) $\frac{1}{2}$ (2) $\frac{1}{4}$ (3) $\frac{1}{6}$ (4) $\frac{1}{8}$

89. If $\sin A = \sin B$ and $\cos A = \cos B$ the value of A in terms of B is :

- (1) $A = 2n\pi + B$ (2) $A = 2n\pi - B$
 (3) $A = n\pi + B$ (4) $A = n\pi - B$

90. $\sin^{-1} \frac{2a}{1+a^2} + \sin^{-1} \frac{2b}{1+b^2} = 2 \tan^{-1} x$

The value of x is :

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

91. From an aeroplane vertically over a straight horizontal road, the angle of depression of two consecutive mile stones on opposite sides of the aeroplane are observed to be α and β . Then the height in miles of aeroplane above the road is :

- (1) $\frac{\tan \alpha + \tan \beta}{\tan \alpha \tan \beta}$ (2) $\frac{\tan \alpha \tan \beta}{\tan \alpha + \tan \beta}$
 (3) $\frac{\tan \alpha \tan \beta}{\tan \alpha - \tan \beta}$ (4) $\frac{\tan \alpha - \tan \beta}{\tan \alpha \tan \beta}$

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92. The mean deviation of the number 1, 1+d, 1+2d, 1+100d from their mean is 255 then d is equal to :

- (1) 10.0 (2) 20.0 (3) 10.1 (4) 20.2

93. r is the radius of in circle of ΔABC , then r is equal to :

- (1) $S \tan \frac{A}{2}$ (2) $(S-a) \sin \frac{A}{2}$
(3) $(S-a) \tan \frac{A}{2}$ (4) $a \tan \frac{A}{2}$

94. The sides of a ΔABC are 6, 7, 8, the smallest angle being C then length altitude from C is :

- (1) $\frac{7}{2}\sqrt{15}$ (2) $\frac{7}{3}\sqrt{15}$ (3) $\frac{7}{4}\sqrt{15}$ (4) $\frac{7}{3}\sqrt{5}$

95. If $\tan \frac{\alpha}{2}$ and $\tan \frac{\beta}{2}$ are the roots of the equation $8x^2 - 26x + 15 = 0$ then $\cos(\alpha + \beta)$ is equal to :

- (1) $-\frac{627}{725}$ (2) $\frac{627}{725}$
(3) -1 (4) none of these

96. The moment about the point $i+2j-k$ of a force represented by $3i+k$ acting through the point $2i-j+3k$ is :

- (1) $3i+11j+9k$ (2) $3i-11j+9k$
(3) $3i+11j-9k$ (4) $-3i+11j+9k$

97. The moment of the force $5i+10j+16k$ acting at the point $2i-7j+10k$ about the point $-5i+6j-10k$ is :

- (1) $i-12j+135k$ (2) $408i-12j+135k$
 (3) $408i+12j-135k$ (4) $408i-12j-135k$

98. If a b c are vectors then

$a \times (b \times c) + b \times (c \times a) + c \times (a \times b)$ is equal to :

- (1) a (2) b (3) c (4) 0

99. If $a = i-2j+3k$

$$b = 2i+j+k$$

and $c = i+j+k$

then $|(a \times b) \times c|$ is equal to :

- (1) $5\sqrt{14}$ (2) $3\sqrt{14}$ (3) $2\sqrt{14}$ (4) $\sqrt{14}$

100. If a, b, c and a', b', c' are reciprocal system of vectors then $a \times a' + b \times b' + c \times c'$

is equal to :

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

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101. The value of

$$\left[\frac{1}{\log_{xy}(xyz)} + \frac{1}{\log_{yz}(xyz)} + \frac{1}{\log_{zx}(xyz)} \right] \text{ is :}$$

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

102. The value of x in the relation $\log_{10} 3 + \log_{10}(4x + 1) = \log_{10}(x + 1) + 1$ is :

- (1) $\frac{7}{2}$ (2) $-\frac{7}{2}$
(3) $-\frac{2}{11}$ (4) $\frac{1}{11}$

103. The value of $\frac{(243)^{n/5} (3)^{2n+1}}{(9)^n (3)^{n-1}}$ is :

- (1) $\frac{1}{9}$ (2) 9
(3) $\frac{1}{27}$ (4) 3

104. If $x = y^a$, $y = z^b$ and $z = x^c$, then value of (abc) is :

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

105. For all values of 'a', 'b' and 'c'. The algebraic expression

$a^2+b^2+c^2-ab-bc-ca$ is always :

- | | |
|------------------------|------------------------|
| (1) ≥ 0 | (2) ≤ 0 |
| (3) $\geq \frac{1}{2}$ | (4) $\leq \frac{1}{2}$ |

106. If $x = \frac{1}{3}(a+b+c)$, then value of $(x-a)^3 + (y-b)^3 + (x-c)^3$ is equal to :

- | | |
|-----------------------|------------------------|
| (1) $(x-a)(x-b)(x-c)$ | (2) $3(x-a)(x-b)(x-c)$ |
| (3) 0 | (4) $(abc)^3$ |

107. The domain of the function

$f(x) = \sin^{-1} \left\{ \log_2 \left(\frac{x^2}{2} \right) \right\}$ is :

- | | |
|-------------------------|---------------------|
| (1) $1 \leq x \leq 2$ | (2) $x \in [-2, 2]$ |
| (3) $x \in [-2, -1]$ | (4) $x \in [1, 2]$ |

108. If $\log_{\frac{1}{3}} \left(x + \frac{2}{x} \right) < -1$, then value of x is :

- | | |
|-------------------------|---|
| (1) $0 \leq x \leq 2$ | (2) $x \in \{(0, 1) \cup (2, \infty)\}$ |
| (3) $0 \leq x < \infty$ | (4) $2 \leq x < \infty$ |

109. If A is a non-singular matrix of order 3 and $\det(A) = 4$, then $\det(\text{Adj } A)$

is equal to :

(1) 16

(2) 64

(3) 12

(4) 81

110. If the simultaneous equations

$$x + y + z = 6$$

$$x + 2y + 3z = 10$$

$$x + 2y + \lambda z = \mu$$

have a unique solution, then value of ' λ ' is :

(1) $\lambda = \mu$

(2) $\lambda = 3$

(3) $\lambda \neq 3$

(4) $\lambda = -3$

111. If $A + B + C = \pi$, then value of

$$\begin{vmatrix} \sin(A + B + C) & \sin B & \sin C \\ -\sin B & 0 & \tan A \\ \cos(A + B) & -\tan A & 0 \end{vmatrix} \text{ is :}$$

(1) -1

(2) 1

(3) 2

(4) 0

112. If a, b, c are in A.P. then

$$\begin{vmatrix} x+2 & x+3 & x+2a \\ x+3 & x+4 & x+2b \\ x+4 & x+5 & x+2c \end{vmatrix} \text{ is equal to :}$$

- (1) x^3 (2) $3x$
 (3) 0 (4) $4abc$

113. The sum of n term of an A.P. is $3n^2+5n$ and its m^{th} term is 164. The value of 'm' is :

- (1) $m = 26$ (2) $m = 27$
 (3) $m = 28$ (4) $m = 30$

114. Between 1 and 31 are inserted 'm' A.M. so that the ratio of the 7th and $(m-1)^{\text{th}}$ means is 5 : 9. The value of 'm' is :

- (1) $m = 20$ (2) $m = 24$
 (3) $m = 13$ (4) $m = 14$

115. Sum of geometric series

$$\frac{1}{2} + \frac{1}{3^2} + \frac{1}{2^3} + \frac{1}{3^4} + \frac{1}{2^5} + \frac{1}{3^6} + \dots \dots \dots \infty, \text{ is :}$$

- (1) $\frac{3}{4}$ (2) $\frac{17}{24}$
 (3) $\frac{19}{24}$ (4) $\frac{5}{6}$

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116. Sum of the series $5+7+13+31+85+\dots$ to n terms is :

- (1) $3^n + 8n - 1$ (2) $\frac{1}{2}[3^n + 8n - 1]$
(3) $3^n - 8n + 1$ (4) $\frac{1}{2}[3^n - 8n + 1]$

117. The number of irrational terms in the expansion of $(4^{1/5} + 7^{1/10})^{45}$ is :

- (1) 38 (2) 39
(3) 40 (4) 41

118. The coefficient of x^6y^3 in the expansion of $(x + 2y)^9$ is :

- (1) 672 (2) 670
(3) 84 (4) 112

119. In how many ways can 7 plus (+) signs and 5 minus (-) signs be arranged in a row so that no two minus (-) signs are together ?

- (1) 54 (2) 58
(3) 56 (4) 336

120. How many arrangements can be made with the letters of the word 'MATHEMATICS' if vowels are together ?

(1) 1080 (2) 120960

(3) 10080 (4) 484040

121. If ${}^{10}P_r = 5040$, then value of 'r' is :

(1) $r = 5$ (2) $r = 3$

(3) $r = 2$ (4) $r = 4$

122. The value of $\frac{i^{592} + i^{590} + i^{588} + i^{586} + i^{584}}{i^{582} + i^{580} + i^{578} + i^{576} + i^{574}} - 1$, is :

(1) 0 (2) -1

(3) -2 (4) -3

123. For any complex number z , value of $|R_e(z)| + |I_m(z)|$ is :

(1) $= \sqrt{2}|z|$ (2) $\geq \sqrt{2}|z|$

(3) $\leq 2|z|$ (4) $\leq \sqrt{2}|z|$

124. If $x = 1 + 2i$, then value of $x^3 + 7x^2 - x + 16$, is :

- (1) $-17 + 24i$
- (2) $17 + 24i$
- (3) $17 - 24i$
- (4) $-17 - 24i$

125. Range of the function $f(x) = \frac{1}{\sqrt{x - [x]}}$, is :

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

126. If $f : \mathbb{R} \rightarrow \mathbb{R}$ is given by $f(x) = x^2 + 3$, then pre-image of an element 39 under f is :

- (1) -6
- (2) -6 and 6
- (3) 6
- (4) 36

127. If $A = \{1, 2, 3, 4, 5\}$, then number of proper subsets of A is :

- (1) 120
- (2) 32
- (3) 33
- (4) 31

128. Let A and B be two sets, if $A \cap X = B \cap X = \phi$ and $A \cup X = B \cup X$ for some set X, then :

- (1) $A \subset B$ (2) $B \subset A$
 (3) $A = B$ (4) $A \neq B$

129. In a survey of 100 students, the number of students studying the various languages were found to be : English only 18, English but not Hindi 23, English and Sanskrit 8, English 26, Sanskrit 48, Sanskrit and Hindi 8, no language 24. How many students were studying Hindi ?

- (1) 18 (2) 16 (3) 17 (4) 20

130. The maximum number of equivalence relations on the set $A = \{1,2,3\}$ is :

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

131. The perpendicular from the origin to a line meet it at the point (-2,9), then equation of line is :

- (1) $2x - 9y + 85 = 0$ (2) $9x + 2y + 85 = 0$
 (3) $2x - 9y = 85$ (4) $9x - 2y + 85 = 0$

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132. If the lines $y = 3x + 1$ and $2y = x + 3$ are equally inclined to the line $y = mx + 4$, then value of 'm' is :

(1) $\frac{2 + 5\sqrt{2}}{7}$

(2) $\frac{2 - 5\sqrt{2}}{7}$

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

(4) $\frac{2 \pm 5\sqrt{2}}{7}$

133. The value of ' λ ' for which the lines

$$3x + 4y = 5$$

$$5x + 4y = 4$$

and $\lambda x + 4y = 6$

meet at a point is :

(1) 2

(2) 1

(3) 0

(4) 3

134. The equation of a circle of radius 5 which lies within the circle

$x^2 + y^2 + 14x + 10y - 26 = 0$ and which touches the given circle at the

point $(-1, 3)$; is :

(1) $x^2 + y^2 + 8x + 2y = 8$

(2) $(x - 4)^2 + (y + 1)^2 = 5^2$

(3) $x^2 + y^2 - 8x - 2y = 8$

(4) $(x + 1)^2 + (y + 4)^2 = 10^2$

135. The equation of the tangents to the circle $x^2 + y^2 - 2x - 4y - 20 = 0$

which pass through the point $(8,1)$; is :

- (1) $4x - 3y - 35 = 0$ and $3x + 4y = 20$
- (2) $4x - 3y = 15$ and $3x - 4y + 20 = 0$
- (3) $4x + 3y = 15$ and $3x + 4y = 35$
- (4) $4x + 3y = 35$ and $3x - 4y = 20$

136. The equation $16x^2 + y^2 + 8xy - 74x - 78y + 212 = 0$ represents :

- (1) a circle
- (2) a parabola
- (3) an ellipse
- (4) a hyperbola

137. The eccentricity of an ellipse $16x^2 + 25y^2 = 400$, is :

- (1) $\frac{3}{5}$
- (2) $\frac{5}{3}$
- (3) $\frac{\sqrt{41}}{5}$
- (4) $\frac{3}{4}$

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138. The equation of the ellipse whose foci are (2,3), (-2, 3) and whose semi-minor axis is $\sqrt{5}$, is :

- (1) $5x^2 + 9y^2 + 54y + 18 = 0$ (2) $5x^2 + 9y^2 - 54xy + 4y + 18 = 0$
(3) $5x^2 + 9y^2 - 54y + 36 = 0$ (4) $9x^2 + 5x^2 + 54x + 36 = 0$

139. The equation of the hyperbola whose conjugate axis is 5 and the distance between the foci is 13, is :

- (1) $\frac{x^2}{36} - \frac{y^2}{25} = 1$ (2) $25x^2 - 144y^2 = 900$
(3) $\frac{y^2}{36} - \frac{x^2}{25} = 1$ (4) $144x^2 - 25y^2 = 900$

140. The length of the straight line $x - 3y = 1$ intercepted by the hyperbola $x^2 - 4y^2 = 1$ is :

- (1) $\frac{6}{\sqrt{5}}$ (2) $3\sqrt{\frac{2}{5}}$
(3) $6\sqrt{\frac{2}{5}}$ (4) $8\sqrt{\frac{2}{5}}$

141. The value of $\lim_{x \rightarrow 0} (1 + 2x)^{\frac{x+3}{x}}$ is :

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

142. If $x = \sec \theta - \cos \theta$ and $y = \sec^n \theta - \cos^n \theta$, then $\left(\frac{dy}{dx}\right)^2$ is equal to :

(1) $\frac{n^2 (y + 4)}{x^2 + 4}$

(2) $\frac{n^2 (y^2 + 4)}{x^2 + 4}$

(3) $\frac{n^2 y^2 - 4}{x^2 + 4}$

(4) $\frac{n^2 y^2 + 4}{x^2 - 4}$

143. The equation of the normal to the curve $x^2 = 4y$, which passes through the point (1,2) is :

(1) $x + y = 3$

(2) $x + 2y = 3$

(3) $2x + y = -3$

(4) $y = x - 1$

144. The area of a right-angled triangle of a given hypotenuse is maximum, when :

(1) Hypotenuse = Base + Perpendicular

(2) Base = $\frac{1}{2}$ Hypotenuse

(3) Base = Perpendicular

(4) Base = Perpendicular = Hypotenuse

145. The value of $\int x^x (1 + \log x) dx$ is :

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

146. The area bounded by the curve $x^2 = 4y$ and the line $x = 4y - 2$ is

- (1) $\frac{15}{8}$ square units (2) $\frac{9}{4}$ square units
 (3) $\frac{9}{8}$ square units (4) $\frac{15}{2}$ square units

147. Differential equation of all straight lines which are at fixed distance 'p' from the origin, is :

(1) $p^2 = \frac{\left(y - x \cdot \frac{dy}{dx}\right)^2}{1 + \left(\frac{dy}{dx}\right)^2}$

(2) $p^2 = \frac{\left(y + x \cdot \frac{dy}{dx}\right)^2}{1 + \left(\frac{dy}{dx}\right)^2}$

(3) $p^2 \left[1 - \left(\frac{dy}{dx}\right)^2\right] = y - x \cdot \frac{d^2y}{dx^2}$

(4) $p^2 \left[1 + \frac{d^2y}{dx^2}\right] = y - x \cdot \frac{dy}{dx}$

148. If $\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0$, then

(1) $x\sqrt{1+y^2} + y\sqrt{1+x^2} = A$

(2) $x\sqrt{1-y^2} - y\sqrt{1-x^2} = A$

(3) $\frac{\sqrt{1-y^2}}{\sqrt{1-x^2}} = A$

(4) $x\sqrt{1-y^2} + y\sqrt{1-x^2} = A$

where A is an arbitrary constant. ($|A| \leq 1$)

149. Solutions of differential equation $(x-y)\frac{dy}{dx} - (x+y) = 0$, are :

(1) $\tan^{-1}\left(\frac{y}{x}\right) - \log(x^2 + y^2) = A$

(2) $2\tan^{-1}\left(\frac{y}{x}\right) + \log(x^2 - y^2) = A$

(3) $2\tan^{-1}\left(\frac{y}{x}\right) = A + \log(x^2 + y^2)$

(4) $2\tan^{-1}\left(\frac{x}{y}\right) = A + e^{x^2 + y^2}$

Where A is an arbitrary constant.

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150. Solutions of differential equation

$$\frac{dy}{dx} + \frac{2}{x}y = 3x^2y^{\frac{4}{3}}, \quad x > 0, \text{ are :}$$

$$(1) \quad y^{-\frac{1}{3}} = -3x^3 + Ax^{\frac{2}{3}}$$

$$(2) \quad 7y^{-\frac{1}{3}} = -3x^3 + Ax^{\frac{2}{3}}$$

$$(3) \quad 7y^{-\frac{1}{3}} = 3x^{\frac{7}{3}} + Ax^{\frac{2}{3}}$$

$$(4) \quad y^{\frac{1}{3}} = 3x^3 + Ax^{\frac{1}{3}}$$

Where A is an arbitrary constant.

ROUGH WORK
रफ़ कार्य

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ROUGH WORK
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ROUGH WORK

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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 30 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 एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्नपुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुक्रमांक 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 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 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 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 एम 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/होगी।