

**CICIT2016A**

Booklet Serial No.:

Number of Questions: 100

Time Allowed: 2 hrs.

Booklet Contains pages: 30

Maximum Marks: 400

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Name of the candidate \_\_\_\_\_

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Centre of Examination \_\_\_\_\_

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Candidate's Signature \_\_\_\_\_

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1. Please enter **THE LAST FIVE DIGITS** of your roll no. in the OMR sheet. For example, if your roll no. is ABCDE73867, fill as

7	3	8	6	7
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2. For each correct answer you will get + 4 marks. There will be no negative marking.
3. Use only BLUE or BLACK BALL POINT PEN for completely darkening the answer circle. For Example:



4. Rough work is to be done only on the Test Booklet and not on the answer sheet.
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7. **Candidates should hand over the answer sheet (OMR sheet) to the invigilator at the end of the examination.**
8. **The answer key will be uploaded within 24 hours from the conclusion of the entrance examination on the official website of the University. The candidate is required to visit the website to check the answer key vis-a-vis the question paper used. In case of any discrepancy/inconsistency/error vis-à-vis the question paper and answer key, the candidate concerned can register a complaint within 48 hours from the time of uploading of the answer key.**
9. Candidates shall not leave the examination hall until they are asked to do so.



Q1) If  $z_1$  and  $z_2$  are two complex numbers such that  $|z_1 + z_2|^2 = |z_1|^2 + |z_2|^2$ , then

Statement I:  $\overline{z_1 z_2}$  is complex

Statement II:  $\overline{z_1 z_2}$  is complex

Statement III:  $\overline{z_1 z_2} + z_1 \overline{z_2} = 0$

Statement IV:  $O, z_1$  and  $z_2$  are vertices of a right angled triangle

- A. Only statement III is true.
- B. Only statement IV is true.
- C. Only statements III and IV are true.
- D. All the statements are true.

Q2) A man walks a distance of 3 units from the origin towards North-East ( $N 45^\circ E$ ) to reach position  $A$ . From there he walks a distance of 4 units towards North-West ( $N 45^\circ W$ ) to reach position  $P$ . Then position of  $P$  in argand plane is

- A.  $3e^{i\pi/4} + 4i$
- B.  $(3 - 4i)e^{i\pi/4}$
- C.  $(3 + 4i)e^{i\pi/4}$
- D.  $(4 + 3i)e^{i\pi/4}$

Q3) Sum of the series  $2^2 - 5^2 + 8^2 - 11^2 + 14^2 - 17^2 + \dots + 152^2 - 155^2$  is

- A. -6123
- B. -12246
- C. -3081
- D. -78

Q4) A teacher is giving his class a 10 question quiz. However, in order to prevent cheating, each copy of the quiz has the 10 questions in random order. The probability that the two students seated next to each other will have the same version of "Question 1" is

- A. 0.04
- B. 0.02
- C. 0.1
- D. 0.01

Q5) Two persons A and B have equal number of sons. There are three cinema tickets which are to be distributed among the sons of A and B. The probability that all the tickets go to sons of A is  $1/20$ . The number of sons to each of them is,

- A. 3
- B. 4
- C. 5
- D. 6

Q6) The letters of word 'INNOVATION' are written down at random in a row. If  $E_1$  denotes the event that two 'I' are together and  $E_2$  denote the event that two 'O' are together, then

Statement I:  $P(E_1) = P(E_2)$

Statement II:  $P(E_1 \cap E_2) = 2/45$

Statement III:  $P(E_2/E_1) = 2/11$

Statement IV:  $P(E_1 \cup E_2) = 14/45$

- A. Only statement I is correct.
- B. Statement I and II two are correct.
- C. Statement III is correct.
- D. Statement III and IV are correct.

Q7) If the integers 'm' and 'n' are chosen at random between 1 and 100, then the probability that a number of the form  $7^m + 7^n$  is divisible by 5 equals

- A. 1/4
- B. 1/7
- C. 1/8
- D. 1/49

Q8) If  $\vec{a}, \vec{b}, \vec{c}$  ( $\vec{b}, \vec{c}$  are non-parallel) are unit vectors such that  $\vec{a} \times (\vec{b} \times \vec{c}) = (1/2)\vec{b}$ , then the angle which  $\vec{a}$  makes with  $\vec{b}$  and  $\vec{c}$  are

- A.  $30^\circ, 60^\circ$
- B.  $60^\circ, 90^\circ$
- C.  $90^\circ, 60^\circ$
- D.  $60^\circ, 30^\circ$

Q9) If P and Q are two given points on the curve  $y = x + 1/x$  such that  $\overrightarrow{OP} \cdot \hat{i} = 1$  and  $\overrightarrow{OQ} \cdot \hat{i} = -1$  where  $\hat{i}$  is a unit vector along x-axis then the length of the vector  $3\overrightarrow{OP} + 2\overrightarrow{OQ}$  is

- A.  $\sqrt{5}$
- B.  $3\sqrt{5}$
- C.  $2\sqrt{5}$
- D.  $5\sqrt{5}$

Q10) The three vectors  $\hat{i} + \hat{j}, \hat{j} + \hat{k}, \hat{k} + \hat{i}$  taken two at a time form three planes. The three unit vectors drawn perpendicular to three planes from a parallelepiped of volume

- A. 1/3 cu units
- B. 4 cu units
- C.  $3\sqrt{3}/4$  cu units
- D.  $4/(3\sqrt{3})$  units

Q11) The value of the integral  $\int_0^{\pi/4} \frac{\cos^2 x}{\sin x + \cos x} + \int_{\pi/4}^0 \frac{\sin^2 x}{\sin x + \cos x}$  is

- A.  $\frac{1}{\sqrt{2}} - 1$
- B.  $\frac{1}{\sqrt{2}} + 1$
- C.  $\sqrt{2} + 1$
- D.  $\sqrt{2} - 1$

Q12) If the antiderivative of  $f(x)$  is  $e^x$  and antiderivative of  $g(x)$  is  $\cos x$ , then  $\int f(x)\cos x dx + \int g(x)e^x dx$  is equal to

- A.  $f(x) + g(x) + C$
- B.  $f(x)g(x) + C$
- C.  $f(x) - g(x) + C$
- D.  $e^x \cos x + C$

**For questions 13 – 14:** The accompanying figure shows the graph of a function  $f(x)$  with domain  $[0, 2]$  and range  $[0, 1]$

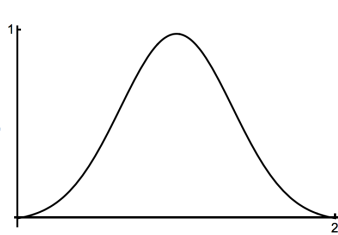


Figure I

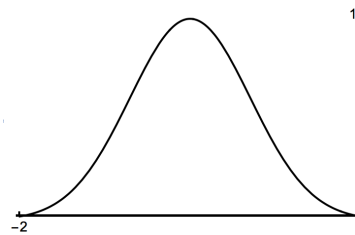


Figure II

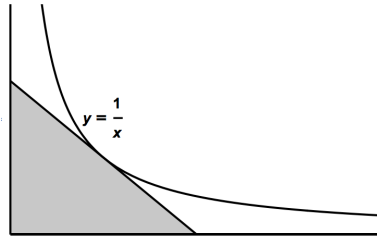
Q13) Figure II represents the graph of

- A.  $2f(x)$
- B.  $f(x-2)$
- C.  $f(x+2)$
- D.  $f(x-2) + 1$

Q14) The domain and range respectively of

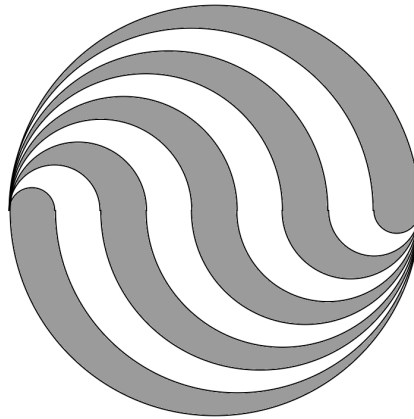
- A.  $f(-x)$  are  $[-2, 0]$  and  $[-1, 0]$
- B.  $f(x) - 1$  are  $[0, 2]$  and  $[0, 1]$
- C.  $f(x) + 2$  are  $[0, 2]$  and  $[1, 2]$
- D.  $-f(x+1) + 1$  are  $[-1, 1]$  and  $[0, 1]$

Q15) The area of the triangle enclosed by the axes and the tangent to the parabola  $y = \frac{1}{x}$ , at any point on the parabola is (figure)



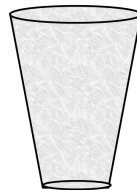
- A. 2
- B. 3
- C. 4
- D. 1

Q16) A bigger circle of radius 9 units has been divided into 9 regions USING semicircles of integer radius. If the area of the largest region is written as  $A\pi$  square units, then the value of  $A$  is



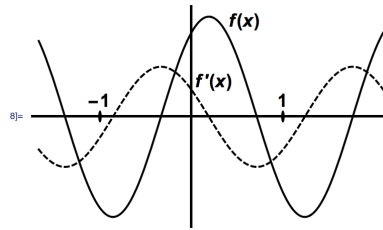
- A. 3
- B. 6
- C. 9
- D. 12

Q17) Water is poured into a glass shaped as below at a constant rate. The rate of change of the height of the water level in the glass is



- A. zero
- B. constant
- C. decreasing
- D. increasing

Q18) The graph of a function  $f(x)$  and its first derivative  $f'(x)$  (in dotted line) is given in the figure. Then



- A.  $f'(-1) < f''(1)$
- B.  $f'(-1) > f''(1)$
- C.  $f'(1) > f''(-1)$
- D.  $f'(1) = f''(-1)$

Q19) Let  $f(x) = \frac{\alpha x}{x+1}$ . Then the value of  $\alpha$  for which  $f(f(x)) = x$  is

- A.  $\sqrt{2}$
- B.  $-\sqrt{2}$
- C. 1
- D. -1

Q20) The real valued function  $f(x) = \frac{(a^x - 1)}{x^n(a^x + 1)}$  is even, then the value of  $n$  can be

- A. -3
- B. -2/3
- C. 4/3
- D. 2

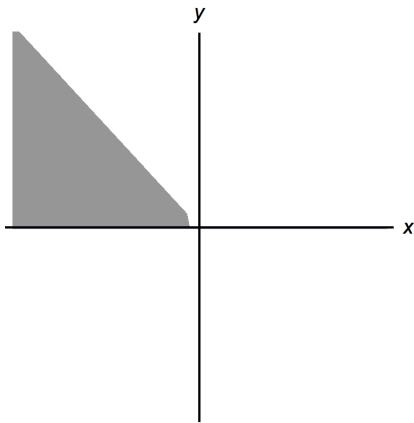
Q21) Let  $S = \left\{ (x, y) : \frac{x^2}{9} + \frac{y^2}{4} \leq 1 \right\}$  and  $T = \{ (x, y) : |x| \leq 3 \text{ and } |y| \leq 2 \}$

- A.  $S \subset T$
- B.  $T \subset S$
- C.  $S = T$
- D.  $T - S = \phi$

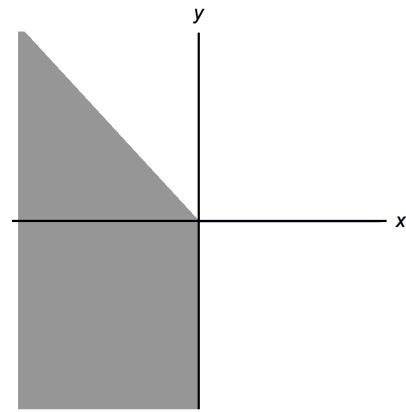
Q22) Let  $A$  be the set of all points in a plane. Let  $R$  be a relation in  $A$  such that for any two points  $a$  and  $b$ ,  $aRb \Leftrightarrow b$  is within two centimeters from  $a$ .

- A.  $R$  is reflexive and symmetric but not transitive on  $A$ .
- B.  $R$  is symmetric but neither reflexive nor transitive on  $A$ .
- C.  $R$  is an equivalence relation on  $A$ .
- D.  $R$  is neither reflexive, symmetric or transitive on  $A$ .

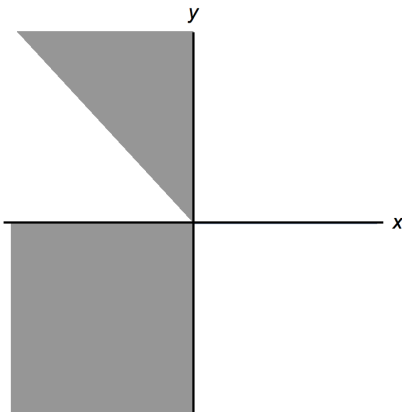
Q23) If  $A = \{\theta : 2 \cos^2 \theta + \sin \theta \leq 2\}$  and  $B = \{\theta : \pi/2 \leq \theta \leq 3\pi/2\}$ , then the region for  $(A \cap B)$  is



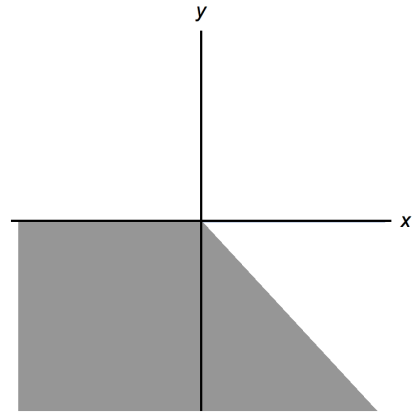
REGION I



REGION II



REGION III



REGION IV

- A. REGION I
- B. REGION II
- C. REGION III
- D. REGION IV

Q24)  $f(x)$  is defined on the interval  $[0, 1]$  by

$$f(x) = \begin{cases} x & , x \in Q \\ 1-x & , x \notin Q \end{cases} \text{ , where } Q \text{ is the set of rational numbers.}$$

- A.  $f(f(\sqrt{0.2})) = 1 - \sqrt{0.2}$
- B.  $f(f(\sqrt{0.2})) = 1$
- C.  $f(f(\sqrt{0.2})) = \sqrt{0.2}$
- D.  $f(f(\sqrt{0.2})) = -\sqrt{0.2}$



Q25) Let  $f(x) = 1 + x^2$  and  $(f \circ g)(x) = 1 + x^2 - 2x^3 + x^4$ . A possible value of  $g(3)$  is

- A. 2
- B. 3
- C. 5
- D. 6

Q26) If  $\alpha, \beta$  are the roots of  $ax^2 + bx + b = 0$ , then  $\sqrt{\alpha/\beta} + \sqrt{\beta/\alpha} + \sqrt{b/a}$  is equal to

- A. 0
- B. 1
- C. 2
- D.  $2\sqrt{b/a}$

Q27) If  $P(x) = ax^2 + bx + c, Q(x) = -ax^2 + dx + c$  where  $ac \neq 0$  then  $P(x) \cdot Q(x) = 0$  has

- A. at least three real roots
- B. no real roots
- C. at least two real roots
- D. two real and two imaginary roots

Q28) Solution of  $0 < |3x + 1| < 1/3$  is

- A.  $(-4/9, -2/9)$
- B.  $[-4/9, -2/9]$
- C.  $(-4/9, -2/9) - 1/3$
- D.  $(-4/9, -2/9) - \{-1/3\}$

Q29) The value of common difference of an A.P. which makes  $T_1 \cdot T_2 \cdot T_7$  least, given that  $T_7 = 9$  is

- A.  $33/2$
- B.  $5/4$
- C.  $33/20$
- D.  $5/8$

Q30) Let  $f(x + y) = f(x) + f(y)$  and  $f(x) = x^2 g(x) \forall x, y \in R$  where  $g(x)$  is continuous then  $f'(x)$  is

- A.  $g'(x)$
- B.  $g(0)$
- C.  $g(0) + g'(x)$
- D. 0

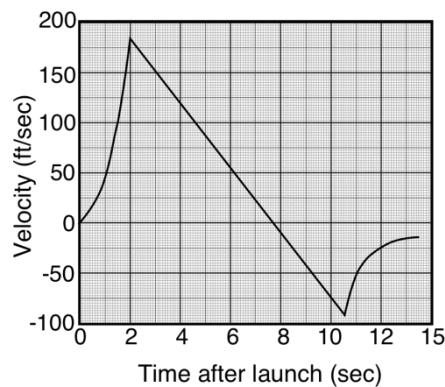
Q31) The set of points of discontinuities of the function  $f(x) = \sqrt{x} - [\sqrt{x}]$ , where  $[x]$  denotes the greatest integer less than or equal to  $x$ , contains the set

- A.  $(0, \infty)$
- B.  $\{n^2 \mid n \in \mathbb{N}\}$
- C.  $\mathbb{N}$
- D.  $\{2n \mid n \in \mathbb{N}\}$

Q32) If  $g$  is the inverse of  $f$  and  $f'(x) = 1/(2 + x^n)$ , then  $g'(x)$  is equal to

- A.  $2 + x^n$
- B.  $2 + \{f(x)\}^n$
- C.  $2 + \{g(x)\}^n$
- D.  $2 - \{g(x)\}^n$

**For questions 33 – 34:** When a model rocket is launched, the propellant burns for a few seconds, accelerating the rocket upward. After burnout, the rocket coasts upward for a while and then begins to fall. A small explosive charge pops out a parachute shortly after the rocket starts down. The parachute slows the rocket to keep it from breaking when it lands. The figure here shows velocity data from the flight of the model rocket. Then



Q33) The rocket reached its highest point in approximately

- A. 2 sec
- B. 8 sec
- C. 10.5 sec
- D. 13.5 sec

Q34) The parachute popped out in approximately

- A. 2 sec
- B. 8 sec
- C. 10.8 sec
- D. 13.5 sec

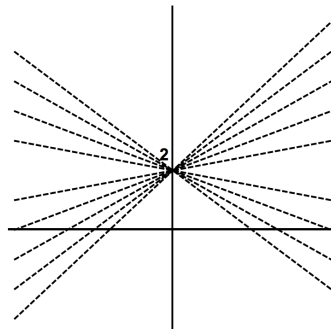
Q35) The mean of the values  $0,1,2,\dots,n$  with the corresponding weights  ${}^nC_0, {}^nC_1,\dots, {}^nC_n$  respectively is

- A.  $\frac{2^n}{(n+1)}$
- B.  $\frac{2^{(n+1)}}{n(n+1)}$
- C.  $\frac{(n+1)}{2}$
- D.  $\frac{n}{2}$

Q36) The eccentricity of the ellipse which meets the straight line  $\frac{x}{7} + \frac{y}{2} = 1$  on the x-axis and the straight line  $\frac{x}{3} - \frac{y}{5} = 1$  on the y-axis and whose axis lie along the axis of coordinate

- A.  $\frac{3\sqrt{2}}{7}$
- B.  $\frac{2\sqrt{6}}{7}$
- C.  $\frac{\sqrt{3}}{7}$
- D.  $\frac{2\sqrt{3}}{7}$

Q37) The family of solutions of a differential equation are plotted as



The differential equation is given as

- A.  $y = x \frac{dy}{dx}$
- B.  $\frac{d^2y}{dx^2} = 0$
- C.  $\frac{dy}{dx} = 2$
- D.  $y = x \frac{dy}{dx} + 2$

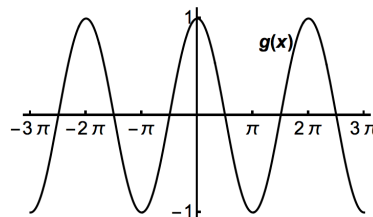
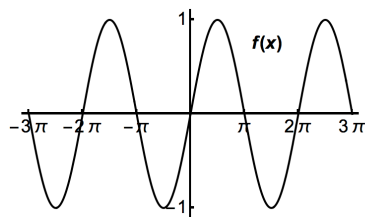
Q38) The minimum value of  $24 \sin \theta - 7 \cos \theta$  is

- A. -7
- B. 17
- C. 0
- D. -25

- Q39) The number of values of  $x$  in the interval  $[0, 5\pi]$  satisfying the equation  $3 \sin^2 x - 7 \sin x + 2 = 0$  is
- A. 0
  - B. 5
  - C. 6
  - D. 10

- Q40) The angular depression of the top and the foot of the chimney seen from the top of a tower on the same base level as the chimney are  $\tan^{-1} \frac{4}{3}$  and  $\tan^{-1} \frac{5}{2}$  respectively. If the height of the tower is 150m, then the distance between the top of the chimney and the tower is
- A. 100 m
  - B. 175 m
  - C. 125 m
  - D. 150 m

Q41)  $f(x)$  and  $g(x)$  are two functions whose graphs are given as



The graph of  $f(x) - g(x)$  is

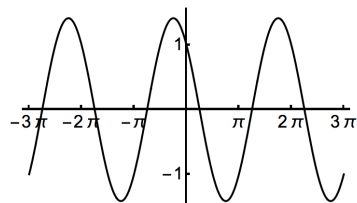


FIGURE I

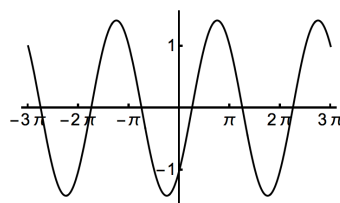


FIGURE II

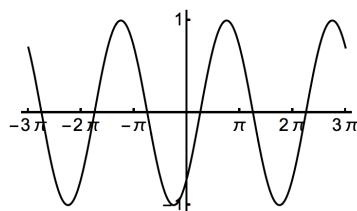


FIGURE III

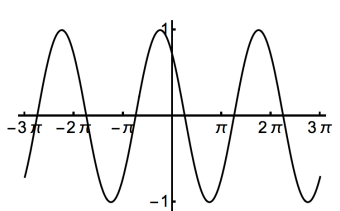


FIGURE IV

- A. FIGURE I
- B. FIGURE II
- C. FIGURE III
- D. FIGURE IV

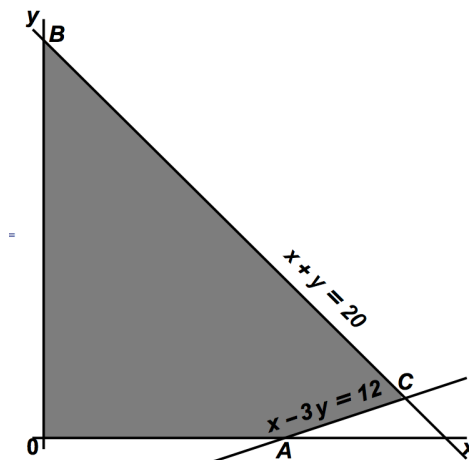
Q42) For  $\pi/2 < \theta < \pi$ , the value of the expression

$$\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} - \sqrt{\frac{1+\sin\theta}{1-\sin\theta}}$$

is

- A. 2
- B. -2
- C.  $2 \tan \theta$
- D.  $-2 \tan \theta$

**For questions 43 – 44:** The graphical representation of the constraints of a linear programming problem (LPP) is



The equations of the lines are  $x + y = 20$  and  $x - 3y = 12$ .

Q43) The constraints associated with the LPP is

- A.  $x + y \leq 20, x - 3y \leq 12, x \geq 0, y \geq 0$
- B.  $x + y \leq 20, x - 3y \geq 12, x \geq 0, y \geq 0$
- C.  $x + y \geq 20, x - 3y \leq 12, x \geq 0, y \geq 0$
- D.  $x + y \geq 20, x - 3y \geq 12, x \geq 0, y \geq 0$

Q44) If the objective function of the LPP is to maximize  $2x + 3y$ , then the maximum value of the objective function occurs

- A. along the  $x$  – axis.
- B. at the point  $A$ .
- C. at the point  $B$ .
- D. at the point  $C$ .

Q45) The value of  $a$  for which the system of linear equations  $ax + y + z = 0, ay + z = 0, x + y + z = 0$  possesses non-trivial solution is

- A. 1
- B. 1, 2
- C. 1, -1
- D. 3

Q46) If  $f(x) = \begin{vmatrix} a & -1 & 0 \\ ax & a & -1 \\ ax^2 & ax & a \end{vmatrix}$ , then  $f(2x) - f(x)$  equals

- A.  $a(2a + 3x)$
- B.  $ax(2x + 3a)$
- C.  $ax(2a + 3x)$
- D.  $x(2a + 3x)$

Q47) Let  $\Delta = \begin{vmatrix} 1 & \sin x & 1 \\ -\sin x & 1 & \sin x \\ -1 & -\sin x & 1 \end{vmatrix}$ , then  $\Delta$  lies in the interval

- A.  $[2, 3]$
- B.  $[3, 4]$
- C.  $[2, 4]$
- D.  $(2, 4)$

Q48) The point  $(3, 2)$  is reflected in the y-axis and then moved a distance of 5 units towards the negative side of y-axis. The coordinates of the point thus obtained are

- A.  $(-3, -3)$
- B.  $(3, 3)$
- C.  $(-3, 3)$
- D.  $(3, -3)$

Q49) The values of  $\lambda$  and  $\mu$  for which the system of equations  $x + y + z = 6$ ,  $x + 2y + 3z = 10$  and  $x + 2y + \lambda z = \mu$  have no solution are:

- A.  $\lambda = 3, \mu = 10$
- B.  $\lambda = 3, \mu \neq 10$
- C.  $\lambda \neq 3, \mu = 10$
- D.  $\lambda \neq 3, \mu \neq 10$

Q50) If  $\text{Arg}(z) < 0$ , then  $\text{Arg}(-z) - \text{Arg}(z)$  is

- A.  $\pi$
- B.  $-\pi/4$
- C.  $-\pi/2$
- D.  $\pi/2$

Q51) For any complex number  $z$ , the minimum value of  $|z| + |z - 1|$  is

- A. 1
- B. 10
- C. 2
- D. 3

Q52) The complex number  $z = x + iy$ , which satisfy the equation  $\left| \frac{z - 2i}{z + 2i} \right| = 1$  lies on

- A. the axis of  $x$ .
- B. the straight line  $y + 2 = 0$ .
- C. the circle passing through  $(1, 1)$ .
- D. parabola whose vertex is  $(0, 1)$ .

Q53) The complex number  $\sin(x) + i \cos(2x)$  and  $\cos(x) - i \sin(2x)$  are conjugate to each other for

- A.  $x = n\pi$
- B.  $x = \left( n + \frac{1}{2} \right) \pi$
- C.  $x = 0$
- D. no value of  $x$

Q54)  $a > 1$  is a constant satisfying the relation  $\int_1^a \frac{x-1}{x+\sqrt{x}} dx = 4$ . The value of

$$a^2 + a + 1 \text{ is}$$

- A. 91
- B. 4
- C. 96
- D. 8

Q55) The greatest possible integral value of  $x$  for which  $x^{300} < 1728^{200}$  is

- A. 144
- B. 143
- C. 145
- D. 154

**For questions 56 – 57:** The mass of a body 'm' moving at a speed 'v' is related to its rest mass ' $m_0$ ' by the relation  $m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$ , where  $c$  is speed of light.

Q56) What should be the speed of body so that its mass is twice of its rest mass?

- A.  $\frac{\sqrt{3}}{4} c$
- B.  $\frac{\sqrt{3}}{2} c$
- C.  $\frac{3}{4} c$
- D.  $\frac{2}{3} c$

Q57) Calculate the ratio of the rest mass and the mass of the body while in motion with speed  $0.6c$ .

- A. 0.6
- B. 0.7
- C. 0.8
- D. 0.9

**For questions 58 – 59:** When a body moves in a circle of radius  $R$  with uniform speed  $v$  which is defined as  $v = \frac{\text{distance}}{\text{time}} = \frac{2\pi R}{t}$ , the acceleration of the body is

defined as  $a = \frac{v^2}{R}$ .

A car with weight 840 kgs. sweeps out a path that is one quarter of a circle of radius 14 m in 2 seconds.

Q58) The speed of the car is

- A. 22 m/sec
- B. 11 m/sec
- C. 2.2 m/sec
- D. 5.5 m/sec

Q59) If the force is defined as mass times acceleration, then the force on the car is

- A. 796 units
- B. 726 units
- C. 876 units
- D. 888 units

Q60) A boy is cycling such that wheels of cycle makes 140 revolutions per minute. If diameter of wheel is 70 cm, then the speed per hour with which the boy cycling is:

- A. 17.48 km/h
- B. 17.37 km/h
- C. 18.48 km/h
- D. 18.37 km/h

Q61) If a village of population 1,000 experiences 40 births, 10 deaths, 5 immigrants, and 10 emigrants in the course of a year, what is its net annual percentage growth rate?

- A. 2.5%
- B. 5%
- C. 0.25%
- D. 0.5%

Q62) In the earth's crust the temperature increases about  $2^\circ\text{C}$  for each 100 m depth below the surface. If the surface temperature is  $30^\circ\text{C}$ , a temperature of  $100^\circ\text{C}$  can be reached at a depth of :

- A. 7 km
- B. 500 m
- C. 35 km
- D. 3.5 km



Q63) In marketing, gross profit is calculated from subtracting production cost from sales and net profit is arrived after deducting other expenses from the gross profit. If in a company sales are Rs. 9,000, gross profit is 30% of sales and net profit is 10% of sales, the expenses are

- A. Rs. 1200
- B. Rs. 1800
- C. Rs. 5300
- D. Rs. 3600

**For questions 64 – 66:** Human blood group is controlled by a factor 'I' which has three alternative forms. They can be represented as  $I^0$ ,  $I^A$  and  $I^B$ . Out of these three every individual carries only two of them, one from father and one from mother. However, depending on the type of factors present on the offspring the blood group is determined as follows

- O blood group:  $I^0 I^0$
- A blood group:  $I^A I^A$  or  $I^0 I^A$
- B blood group:  $I^B I^B$  or  $I^0 I^B$
- AB blood group:  $I^A I^B$

Q64) If these three alternative forms determine the blood group as shown above and each individual gets one from each parent, how many combinations of these forms of the factor 'I' are possible?

- A. 6
- B. 4
- C. 2
- D. 16

Q65) What will be the probability of obtaining an "O" blood group in the 4 children if the mother has 'O' blood group and the father has 'AB' blood group.

- A. 0
- B.  $\frac{1}{4}$
- C.  $\frac{1}{2}$
- D.  $\frac{3}{4}$

Q66) If, mother has 'A' blood group and father has 'B' blood group, what is the probability of obtaining a son or daughter with 'O' blood group?

- A.  $\frac{1}{4}$
- B.  $\frac{1}{8}$
- C.  $\frac{1}{16}$
- D.  $\frac{1}{64}$

Q67) DNA can be multiplied in to many copies (known as amplification) in a test tube from a double stranded DNA templates starting with DNA or RNA. In the subsequent reactions the newly synthesized DNA also act as template and the reaction continues in linear progression till saturation as shown in the figure below.



If in 30 cycles, 100 microgram of DNA is amplified in the reaction, how many cycles will be required to amplify 50 micrograms of DNA.

- A. 30 cycles
- B. 15 cycles
- C. 29 cycles
- D. 14 cycles

Q68) An experiment was performed in a grassland ecosystem to assess grasshopper population. On the first day 100 grasshoppers were captured from a given area, they were marked by painting and released. Six hour later again another lot of 100 grasshoppers were recaptured from the same area. Out of the 100, 90 were unmarked and 10 were marked. The population size in the area may be predicted as

- A. 200
- B. 1,000
- C. 10,000
- D. 1,00,000

Q69) You are given a list of first three prime numbers arranged in ascending order. Now you add first two terms and subtract its result from third term. Whatever you get is appended to the list. Now you add second and third element and subtract the result from fourth element and resultant is appended again to the list. The value of 10<sup>th</sup> term of the list is

- A. 32
- B. 29
- C. 34
- D. 23

Q70) Aijaz, Bikram, Carol and Deepak are trapped on an island. They find a boat that can carry a maximum of two people. Aijaz can row the boat in 30 minutes, Bikram in 1 hour and 10 minutes, Carol in 2 hours and 10 minutes and Deepak in 2 hours and 50 minutes to reach the shore. The boat can only be rowed at the pace of the slower rower. The minimum time required for all 4 of them to reach the shore is

- A. 6 hours 40 minutes
- B. 7 hours 10 minutes
- C. 7 hours
- D. 6 hours 50 minutes

**For questions 71 – 74:** A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of input and rearrangement. (All the numbers are two-digit numbers.)

**Input:** tall 48 rise 76 32 jar high 28 56 barn

**Step I:** 28 tall 48 rise 76 32 jar high 56 barn

**Step II:** 32 28 tall 48 rise 76 jar 56 barn high

**Step III:** 48 32 28 tall rise 76 56 barn high jar

**Step IV:** 56 48 32 28 tall 76 barn high jar rise

**Output:** 76 56 48 32 28 barn high jar rise tall

**New Input:** 84 sit 32 not ink feet 51 27 vain 68 (All the numbers are two-digit numbers.)

Q71) The output of the given new input is

- A. 84 51 32 68 27 feet sit ink not vain
- B. 84 68 51 32 27 feet ink not sit vain
- C. 51 68 32 84 27 feet sit ink not vain
- D. 51 68 32 84 27 sit ink feet not vain

Q72) The following output will be obtained in

32 27 84 sit not 51 vain 68 feet ink

- A. Step IV
- B. Step VI
- C. Step V
- D. Step II

Q73) The word/number at 5th position from the right in Step III is

- A. vain
- B. 51
- C. sit
- D. feet

Q74) The position of 'feet' in the fourth step is

- A. Eighth from the left
- B. Sixth from the left
- C. Fifth from the right
- D. Seventh from the left

Q75) Given exactly one of the following statement is false, then that statement is

Statement I: Statement IV is true.

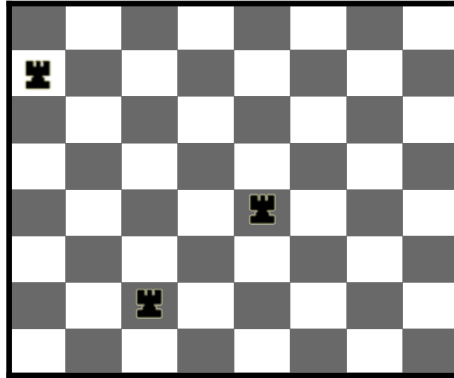
Statement II: Statement I is false.

Statement III: Statement II is false.

Statement IV: Statement III is true.

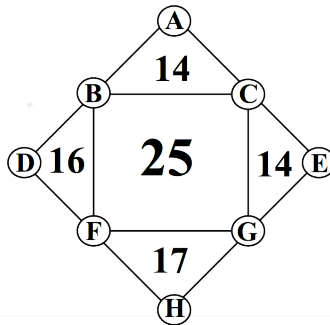
- A. Statement I
- B. Statement II
- C. Statement III
- D. Statement IV

Q76) The number of squares of any size on the given chess board that do not contain a rook is



- A. 125
- B. 116
- C. 109
- D. 104

**For Questions 77 – 79:** In the given figure A, B, ... , H represents numbers 1 to 8 (not necessarily in that order). The numbers given are the total of the numbers surrounding it, for example,  $16 = B + D + F$



Q77) The value of  $C + G + D$  is

- A. 9
- B. 11
- C. 12
- D. 13

Q78) The alphabet of CAGE that has the highest numeric value is

- A. C
- B. A
- C. G
- D. E

Q79) The value of  $F * A - D * E$  is (\* represents multiplication)

- A. 2
- B. 5
- C. 9
- D. 16

Q80) The figure that will come next in the series is

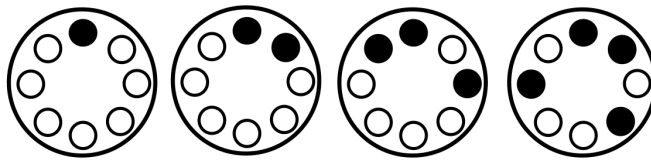


FIGURE I

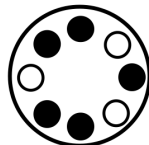


FIGURE II

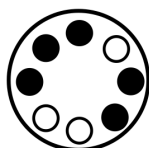


FIGURE III

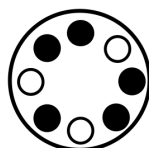
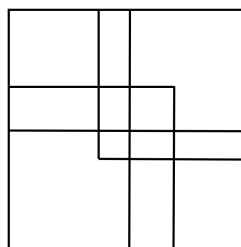


FIGURE IV

- A. FIGURE I
- B. FIGURE II
- C. FIGURE III
- D. FIGURE IV

Q81) The number of squares in the given figure is



- A. 8
- B. 9
- C. 10
- D. 11

Q82) In the given cryptogram, A, B, C, D, E and F are single digits, not necessarily distinct.

$$\begin{array}{r}
 \phantom{X} \phantom{D} \phantom{E} \phantom{F} \phantom{1} \phantom{3} \phantom{2} \\
 \phantom{X} \phantom{D} \phantom{E} \phantom{F} \phantom{1} \phantom{3} \phantom{2} \\
 \phantom{X} \phantom{D} \phantom{E} \phantom{F} \phantom{1} \phantom{3} \phantom{2} \\
 \hline
 X \phantom{D} \phantom{E} \phantom{F} \phantom{1} \phantom{3} \phantom{2} \\
 \hline
 D \phantom{E} \phantom{F} \phantom{1} \phantom{3} \phantom{2}
 \end{array}$$

The value of  $A + B + C + D + E + F$  is

- A. 51
- B. 64
- C. 28
- D. 43

Q83) If the squares in the two figures are of the same size, then the ratio of the shaded portion in Figure 1 is to the shaded portion in Figure 2 is

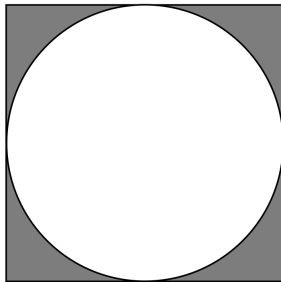


Figure 1

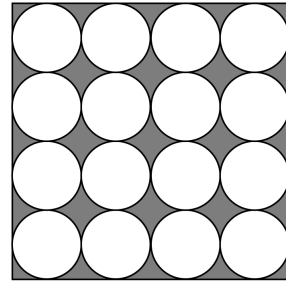


Figure 2

- A. 2 : 1
- B. 1 : 2
- C. 1 : 1
- D. 1 :  $\sqrt{2}$

**For questions 84 – 87:** Five cities all got more rain than usual this year. The five cities are: Ramgarh, Karim Nagar, Kamla Nagar, Sultanpur, and Hamirpur. The cities are located in five different areas of the country (not necessarily in that order): the mountains, the forest, the coast, the desert, and in a valley. The rainfall amounts were: 12 inches, 27 inches, 32 inches, 44 inches, and 65 inches (not necessarily in that order).

- \* The city in the desert got the least rain; the city in the forest got the most rain.
- \* Kamla Nagar is in the mountains.
- \* Ramgarh got more rain than Sultanpur.
- \* Karim Nagar got more rain than Hamirpur, but less rain than Kamla Nagar.
- \* Sultanpur got 44 inches of rain.
- \* The city in the mountains got 32 inches of rain; the city on the coast got 27 inches of rain.

Q84) The city that got the most rain is

- A. Ramgarh
- B. Hamirpur
- C. Sultanpur
- D. Kamla Nagar

Q85) How much rain did Karim Nagar City get?

- A. 12 inches
- B. 27 inches
- C. 32 inches
- D. 65 inches

Q86) The desert city is

- A. Kamla Nagar
- B. Sultanpur
- C. Ramgarh
- D. Hamirpur

Q87) Sultanpur is located

- A. in the mountains
- B. on the coast
- C. in a valley
- D. in the desert

**For questions 88 – 90:**

Seven types of paints A, B, C, D, E, F and G of different colours red, green, yellow, black, blue, white and orange are filled in different tins P, Q, R, S, T, U and V.

- a) The order of the types of paints, colours and the tins is not necessarily in the same order.
- b) Paint B is not kept in tins Q or R and is white in colour.
- c) Paint D is kept in tin V and is not blue or red.
- d) F is kept in tin P and is green in colour.
- e) Paints C and E are kept in tins T and U respectively and are black and yellow in colour respectively.
- f) G is not blue in colour.
- g) Red paint is not kept in tin Q.

Q88) The paint orange in colour is

- A. C
- B. A
- C. D
- D. G

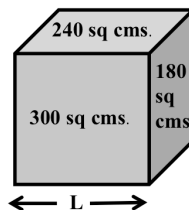
Q89) Paint B is kept in the tin

- A. S
- B. T
- C. U
- D. Q

Q90) The tin that contains blue paint is

- A. R
- B. P
- C. S
- D. None of these

Q91) In the figure given below, the value of L is



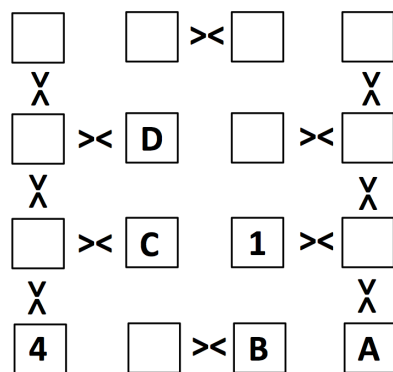
- A. 20 cms
- B. 15 cms
- C. 12 cms

D. 30 cms

Q92) The value of  $(123456789)^2 - (123456788 \times 123456790)$  is

- A. 1
- B. -1
- C. 11
- D. -11

**For questions 93 - 96:** You have to complete the grid such that every row and column contains the numbers 1 to 4 (each number appears exactly once). The symbol ( $\times$ ) between two squares indicate that the numbers in them are neighbours.(e.g. 1  $\times$  2, 3  $\times$  4, 2  $\times$  1). If there is a **symbol** the numbers are **neighbours**. If there is **no symbol** the numbers are **NOT neighbours**. With these information what numbers should come in place of A, B, C and D?



Q93) The number in place of A is

- A. 1
- B. 2
- C. 3
- D. 4

Q94) The number in place of B is

- A. 1
- B. 2
- C. 3
- D. 4

Q95) The number in place of C is

- A. 1
- B. 2
- C. 3
- D. 4

Q96) The number in place of D is

- A. 1
- B. 2
- C. 3
- D. 4



**For questions 97 – 98:** Each question presents a situation and asks you to make a judgment regarding that particular circumstance. Choose an answer based on given information.

Q97) The TV soap opera director wants an actress for the lead role of a mother who perfectly fits the description that appears in the original screenplay. He is not willing to consider actresses who do not resemble the character as she is described in the screenplay, no matter how talented they are. The screenplay describes the mother as an average-sized, forty something grey haired, with deep brown eyes, wheatish complexion, and a brilliant smile. The casting agent has four actresses in mind.

- A. **Actress #1** is a stunning grey-haired beauty who is 5'7" and in her mid-twenties. Her eyes are brown and she has a fair complexion.
- B. **Actress #2** has grey hair, big brown eyes, and a wheatish complexion. She is in her mid-forties and is 5'3".
- C. **Actress #3** is 5'4" and of medium build. She has grey hair, brown eyes, and is in her early forties.
- D. **Actress #4** is a grey-eyed black haired in her early thirties. She's of very slight build and stands at 5'.

His choice of actress can be

- A. 1 or 2
- B. 2 or 3
- C. 1 or 4
- D. 2 or 4

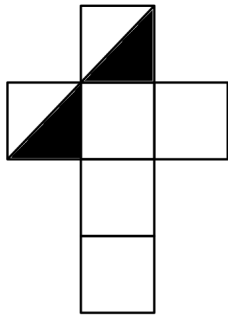
Q98) Mrs.Chatwal took a taxi to meet her three friends for lunch. They were waiting for her outside the restaurant when she pulled up in the car. She was so excited to see her friends that she left her tote bag in the taxi. As the taxi pulled away, she and her friends took notice of the license plate number so they would be able to identify the car when they called the taxi company.

- The four women seem to agree that the plate starts out with the letter D.
- Three of them agree that the plate ends with 12L.
- Three of them think that the second letter is T, and a different three think that the third letter is C.

The four license plate numbers below represent what each of the four women thinks she saw. Which one is most likely the license plate number of the taxi?

- A. DTC 12L
- B. DYC 12L
- C. DTC 12I
- D. DTT 12L

Q99) Cubes that may be obtained from folding the given sheet of paper 'X' are



(X)



(1)



(2)



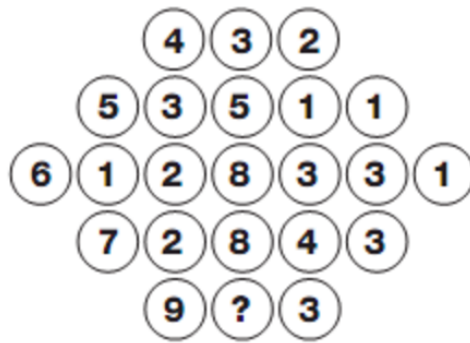
(3)



(4)

- A. 1 and 4 only
- B. 3 and 4 only
- C. 1 and 2 only
- D. 2 and 3 only

Q100) What number will replace '?' in the figure?



- A. 9
- B. 7
- C. 6
- D. 4

## **ROUGH WORK**

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**CLUSTER INNOVATION CENTRE  
(UNIVERSITY OF DELHI)**

Rugby Sevens Building, University Stadium, G.C.Narang Road,  
University of Delhi, Delhi-110007, Ph. 27666702

**Answer Key of Entrance Test for admission to the Course “B.Tech (IT and  
Mathematical Innovations)” held on 23<sup>rd</sup> June 2016**

**ANSWER KEY**

Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer
1	D	26	A	51	A	76	A
2	C	27	C	52	A	77	D
3	B	28	D	53	D	78	A
4	C	29	C	54	A	79	A
5	A	30	D	55	B	80	B
6	B	31	B	56	B	81	C
7	A	32	C	57	C	82	D
8	C	33	B	58	B	83	C
9	A	34	C	59	B	84	A
10	D	35	D	60	C	85	B
11	D	36	B	61	A	86	D
12	B	37	D	62	D	87	C
13	C	38	D	63	B	88	C
14	D	39	C	64	A	89	A
15	A	40	A	65	A	90	D
16	C	41	B	66	D	91	A
17	C	42	C	67	C	92	A
18	A	43	A	68	B	93	A
19	D	44	C	69	D	94	C
20	A	45	A	70	D	95	D
21	A	46	C	71	B	96	A
22	A	47	C	72	D	97	B
23	C	48	A	73	A	98	A
24	C	49	B	74	D	99	A
25	D	50	A	75	B	100	C