MS-CIT
World-class Comprehensive Computer Course

Question Paper
Set- II
Std. – 10th EM/Semi
Subject – Algebra

MKCL KLiC Courses
Gateway to Knowledge Lit Careers

Time : 2 Hrs. **Marks : 40**

Note :
i. All questions are compulsory.
ii. Use of calculator is not allowed.
iii. Figures to the right of questions indicate full marks.

Q.1 A) Choose the correct alternative. **4**

1. If x + y = 10 and x – y = 12, then
   a) x = 11, y = 1 b) x = 11, y = −1 c) x = −11, y = 1 d) x = −11, y = −1
2. For the following table, the values of f_1, f_0 and f_2 are respectively _____

Class	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	2	5	10	8	4

   a) 5, 10, 8 b) 10, 5, 8 c) 8, 10, 5 d) 10, 8, 5
3. If α and β are the roots of the quadratic equation $x^2 – 3x – 2 = 0$, then $\frac{1}{\alpha} + \frac{1}{\beta} =$
   a) $\frac{3}{2}$ b) $\frac{-3}{2}$ c) $\frac{13}{2}$ d) $\frac{-13}{2}$
4. The NAV of a unit in mutual fund scheme is Rs. 10.65, then find the amount required to buy 500 such units.
   a) 5325 b) 5235 c) 532500 d) 53250

B) Solve the following questions. **4**

1. 'Pawan Medical' supplies medicines. On some medicines the rate of GST is 12%, then what is the rate of CGST and SGST ?
2. If n(A) = 6, P(A) = $\frac{3}{4}$, find n(S).
3. Write the following quadratic equation in standard form $ax^2 + bx + c = 0$: $x^2 + 5x = -(3 – x)$.
4. For an A.P., if a = 7, d = 6, find t_n.

Q.2 A) Complete the following activities. (Any two) **4**

1. Fill up the boxes and find out the number of terms in the A.P. 2, 4, 6, ..., 148.

   Here, a = 2, d = ☐, t_n = 148
   $t_n = a + (n – 1)\,d$
   ∴ 148 = ☐
   ∴ 146 = 2n – ☐
   ∴ n = ☐

2. The six faces of a die are marked.

A	B	C	D	E	O

   The event M is getting a vowel on the upper face of the die when it is tossed. Complete the following activity.

   S = {☐}
   n(S) = ☐
   M = {☐}
   n(M) = ☐

3. Complete the following table to draw the graph of the equation $3y - x = 4$.

x		5	2
y	0		2
(x, y)			(2, 2)

B) Solve the following questions. (Any four) **8**

1. In an A.P. 17^{th} term is 7 more than its 10^{th} term. Find the common difference.
2. Draw a histogram of the following data.

Height of student (cm)	135 – 140	140 – 145	145 – 150	150 – 155
No. of students	4	12	16	8

3. Find the purchase price of a share of FV Rs. 100 if it is at premium of Rs. 30. The brokerage rate is 0.3 %.
4. A box contains 5 red, 8 blue and 3 green pens. Rutuja wants to pick a pen at random. What is the probability that the pen is blue ?
5. If $\begin{vmatrix} 4 & 5 \\ m & 3 \end{vmatrix} = 22$, then find the value of m.

Q.3 A) Complete the following activities. (Any one) **3**

1. The total value (with GST) of a remote-controlled toy car is Rs. 1770. Rate of GST is 18% on toys. Find the taxable value, CGST and SGST for this toy-car by completing the following activity.
   Let the amount of GST be Rs. x.
   Total value of remote controlled toy car = Rs. 1770
   ∴ Taxable value of remote controlled toy car = Rs. (1770 – x)
   Now, GST = _____ of taxable value
   ∴ $x = \frac{\cdots}{\cdots} \times (1770 - x)$
   ∴ x = ___
   ∴ GST = _____
   ∴ Taxable value of remote controlled toy car = Rs.(1770 – x) = ____
   But, CGST = SGST = $\frac{GST}{2}$
   ∴ CGST = SGST = ____
2. By filling the following boxes find the quadratic equation whose roots are $1 - 3\sqrt{5}$ and $1 + 3\sqrt{5}$.
   Let $\alpha = 1 - 3\sqrt{5}$ and $\beta = 1 + 3\sqrt{5}$
   ∴ $\alpha + \beta$ = ___
   and $\propto \beta$ = ___
   ∴ The required quadratic equation is
   x^2 - _____ + $\alpha\beta$ = 0
   ∴ x^2 - _____ − 44 = 0

B) Solve the following questions. (Any two) **6**

1. Find k, if $kx(x - 2) + 6 = 0$ has real and equal roots.
2. The following table shows the classification of number of vehicles and their speeds on Mumbai-Pune express way. Find the median of the data.

Average Speed of Vehicle (Km/hr)	60 – 64	65 – 69	70 – 74	75 – 79	80 – 84	85 – 89
No. of vehicles	10	34	55	85	10	6

3. If a card is drawn from a pack of well shuffled 52 playing cards. Find the probability that the card drawn is i. a black card ii. a face card
   iii. a card bearing number between 2 to 5 including 2 and 5.

4. A man borrows Rs. 8000 and agrees to repay with a total interest of Rs. 1360 in 12 monthly instalments. Each instalment being less than the preceding one by Rs. 40. Find the amount of the first instalment.

Q.4 Solve the following questions. (Any two) **8**

1. Calculate the mean of daily income (in Rs.) of the following data about men working in a company by using step deviation method.

Daily income (in Rs.)	< 100	< 200	< 300	< 400	< 500
Number of men	12	28	34	41	50

2. Draw the graphs representing the equations $4x + 3y = 24$ and $3y = 4x + 24$ on the same graph paper. Find the area of the triangle formed by these lines and the X-axis.
3. The radius of a circle is greater than the radius of other circle by 3 m. The sum of their areas is $89\pi m^2$. Find the radius of each circle.

Q.5 Solve the following questions. (Any one) **3**

1. The following frequency distribution table shows the distances travelled by some rickshaws in a day. Observe the table and answer the following questions :

Class (Daily distance travelled in km)	**Continous Classes**	**Frequency (Number of rickshaws)**	**Cumulative Frequency less than type**
60 – 64	59.5 – 64.5	10	10
65 – 69	64.5 – 69.5	34	10 + 34 = 44
70 – 74	69.5 – 74.5	58	44 + 58 = 102
75 – 79	74.5 – 79.5	82	102 + 82 = 184
80 – 84	79.5 – 84.5	10	184 + 10 = 194
85 – 89	84.5 – 89.5	6	194 + 6 = 200

a. Which is the modal class? Why ?
b. Which is the median class and why ?
c. Write the cumulative frequency (C.F.) of the class preceding the median class.

2. The following determinants are obtained from the simultaneous equations in variables x and y.

$D_x = \begin{vmatrix} -11 & a \\ 9 & -4 \end{vmatrix}$, $D_y = \begin{vmatrix} 3 & -11 \\ b & 9 \end{vmatrix}$, $D = \begin{vmatrix} 3 & 2 \\ 7 & -4 \end{vmatrix}$

The solution of the equations are $x = -1$ and $y = -4$. Find the values of a and b. Also find the original simultaneous equations having this solution.