This Question Paper contains 4 Printed Pages.

1030

15E/16E(A)

MATHEMATICS

(English Version)

(Parts A and B)

Time : 3 Hours] *Roll Number :* 2 *[Maximum Marks : 80*

Instructions :

1. *Answer **all** the Questions of **Part – A** on a separate answer book.*
2. *Write the answers to the Questions under **Part – B** on the Question paper itself and attach it to the answer book of **Part – A**.*

PART – A

Time : 2 Hours 30 minutes] *[Marks : 60*

SECTION – I

(6 × 2 = 12 Marks)

Notes : *(1) Answer **all** the following questions.*

*(2) Each question carries **2** marks.*

1. Show that the points A(–6, 10), B(–4, 6) and C(3, –8) are collinear.

2. Write a Quadratic equation whose roots are the values of sin 30° and cos 60°.

3. In an arithmetic progression, first term is '1', last term is 20 and the sum of all the terms is 399, then find the number of terms in the progression.

4. "An observer standing at a distance of 50 metre from the foot of a tower observes its top at an angle of elevation of 45°." Draw a suitable diagram for this situation.

5. If the pair of linear equations :

$(3k + 1)x + 3y - 2 = 0$

and

$(k^2 + 1)x + (k - 2)y - 5 = 0$ has no solutions, then find the value of k.

6. The ratio of radius and slant height of a Right circular cone is 7:25. If its curved surface area is 550 cm^2, then find its radius.

SECTION – II

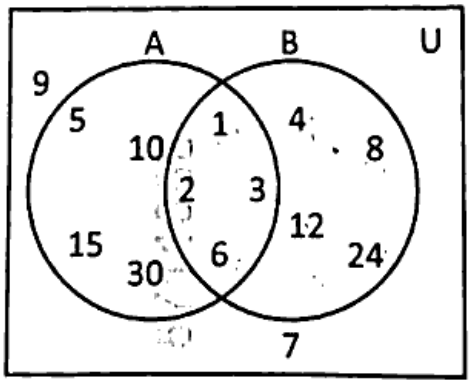
(6 × 4 = 24 Marks)

Notes : *(1) Answer **all** the following questions.*

*(2) Each question carries **4** marks.*

7. From the given Venn diagram, find the sets

$A \cup B$, $A \cap B$, $A - B$ and $B - A$.



8. From a well shuffled deck of cards if a card is selected randomly, then find the probability of getting

(i) A red coloured king

(ii) A black coloured face card

(iii) A diamond card with number 11 on it

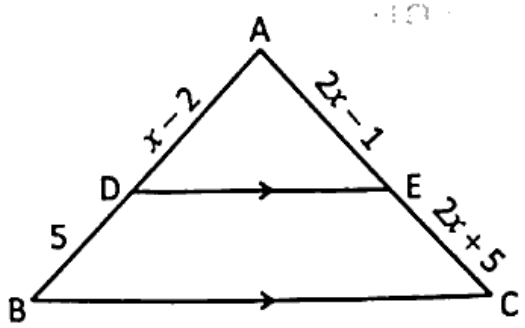
(iv) Queen of clubs

9. Show that

$$\left[\frac{1+\tan^2 A}{1+\cot^2 A}\right] = \left[\frac{1-\tan A}{1-\cot A}\right]^2 = \tan^2 A$$

10. In ΔABC, $DE \parallel BC$.

If $AD = x-2$, $DB = 5$, $AE = 2x-1$, $EC = 2x+5$, then find the value of x.



11. Write the formula for the sum of first 'n' terms of an arithmetic progression and explain each term in it.

12. Show that the triangle with vertices A(–4, 2), B(2, –4) and C(12, 6) forms a Right angled triangle.

SECTION – III

(4 × 6 = 24 Marks)

Notes : *(1) Answer any **4** questions from the given **six** questions.*

*(2) Each question carries **6** marks.*

13. Draw the graph of the polynomial $p(x) = x^2 + 2x - 3$ and find zeroes of the polynomial from the graph.

14. Find the mode of the following data :

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	7	14	13	12	20	11	15	8

P.T.O.

15. Draw a circle of radius 3 cm. Construct a pair of tangents to the circle from an external point which is at a distance of 8 cm from the centre of the circle.

16. If $x^2 + y^2 = 27xy$, then show that $2 \log (x - y) = 2 \log 5 + \log x + \log y$.

17. Find the coordinates of the points which divide the line segment joining the points A(−2, 2) and B(2, 8) into four equal parts.

18. A metallic vessel is in the shape of a cylinder surmounted over a hemisphere. The radii of cylinder and hemisphere are same and the height of the cylindrical part is 10 cm. If the outer surface area of the vessel is 748 cm^2, then find their radii.
