Central Board of Secondary Education

(CBSE)

Board Examination - (March)

Series : EPC20

Set C

Code No. - M -041

Roll No. | | | | | | | |

Candidates must write the code on the title page of the answer-book.

- Please check that this question paper contains 5 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 30 questions.
- Please write down the Serial Number of the question before attempting it.

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FINAL EXAMINATION

MATHEMATICS

Time allowed : 3 hours **Maximum Marks : 80**

General Instructions :

(a) All the questions are compulsory.

(b) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

(c) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.

(d) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(e) Use of calculators is not permitted.

Section - A
Q.Nos. 1 to 20 carry 1 mark each.

Q.No. 1 to 10 are multiple choice questions. Select the most appropriate answer from the given options.

1) Which of the following will have a terminating decimal expansion? (1)

(a) $\frac{77}{210}$ (b) $\frac{23}{30}$ (c) $\frac{125}{441}$ (d) $\frac{23}{8}$

2) Two concentric circles are of radii 5 cm and 3 cm. The length of the chord of larger circle (in cm) which touches the smaller circle is (1)

(a) 4 cm (b) 8 cm (c) 16 cm (d) $\sqrt{34}$ cm

3) In a frequency distribution, the mid value of a class is 10 and the width of the class is 6. The lower limit of the class is (1)

(a) 6 (b) 7 (c) 8 (d) 12

4) The value of $(12)^{3x} + (18)^{3x}$, $x \in N$, ends with the digit. (1)

(a) 2 (b) 8 (c) 0 (d) cannot be determined

5) If $3x + 4y : x + 2y = 9 : 4$, then $3x + 5y : 3x - y$ is equal to (1)

(a) 4 : 1 (b) 1 : 4 (c) 7 : 1 (d) 1 : 7

6) If in two triangles DEF and PQR, $SD = SQ$ and $SR = SE$, then which of the following is not true ?

(a) $\frac{EF}{PR} = \frac{DF}{PQ}$ (b) $\frac{DF}{PQ} = \frac{EF}{RP}$ (c) $\frac{DE}{QR} = \frac{DF}{PQ}$ (d) $\frac{EF}{RP} = \frac{DE}{QR}$ (1)

7) If $\angle ABC$ is right angled at C, then the value of cos $(A + B)$ is

(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$ (1)

8) The value of $\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + ... + \sin^2 90^\circ$ is equal to

(a) 8 (b) 8.5 (c) 9 (d) 9.5

9) C is the mid-point of PQ, if P is $(4, x)$, C is $(y, -1)$ and Q is $(-2, 4)$, then x and y respectively are (1)

(a) -6 and 1 (b) -6 and 2 (c) 6 and -1 (d) 6 and -2

10) The point on the X-axis which if equidistant from the points $A(-2, 3)$ and $B(5, 4)$ is (1)

(a) (0, 2) (b) (2, 0) (c) (3, 0) (d) (-2, 0)

Q.No. 11 to 15 : Fill in the blanks.

11) A cube of side 6 cm is cut into a number of cubes, each of side 2 cm. The number of cubes will be _____(1)

12) If one factor of $x^3 + 7kx^2 - 4kx + 12$ is $(x + 3)$, then the value of k is _____. (1)

13) In $\triangle PQR$, right angled at Q, $PR + QR = 25$ cm and $PQ = 5$ cm. The value of tan P is ____ (1)

14) Three numbers in an AP have sum 24. Its middle term is _____. (1)

15) The probability of a non-leap year having 53 Mondays is _____. (1)

Q.No. 16 to 20 : Answer the following.

16) Can two numbers have 18 as their HCF and 380 as thier LCM ? Give reason. (1)

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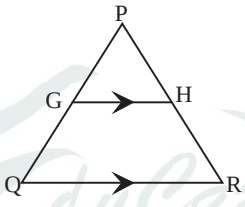
17)	If ratio of corresponding sides of two similar triangles is 5 : 6, then find ratio of their areas. (1)
18)	The diameter of two circles with centres A and B are 16 cm and 30 cm respectively. If area of another circle with centre C is equal to the sum of areas of these two circles, then find the circumference of the circle with centre C. (1)
19)	If the nth term of an AP is $(2n + 1)$, then the sum of its first three terms is (a) $6n + 3$ (b) 15 (c) 12 (d) 21 (1)
20)	$(x^2 + 1)^2 - x^2 = 0$ has (1) (a) four real roots (b) two real roots (c) no real roots (d) one real root
	Section - B **Q.Nos. 21 to 26 carry 2 marks each.**
21)	The sum of n terms of an A.P. is $3n^2 + 5n$. Find the A.P. Hence find its 15th term. (2)
22)	A circle is inscribed in a mABC, with sides AC, AB and BC as 8 cm, 10 cm and 12 cm respectively. Find the length of AD, BE and CF if AB, BC and AC touch the circle at D, E and F respectively. (2)
23)	In the given figure, G is the mid-point of the side PQ of mPQR and $GH \parallel QR$. Prove that H is the midpoint of the side PR of the triangle PQR. (2)  ***OR*** In a rectangle $ABCD$, E is a point on AB such that $AE = \frac{2}{3}AB$. If AB = 6 km and AD = 3 km, then find DE. (2)
24)	The angle of elevation of the top of a chimney from the foot of a tower is 60° and the angle of depression of the foot of the chimney from the top of the tower is 30°. If the height of tower is 40 m, find the height of smoke emitting chimney. According to pollution control norms, the minimum height of a smoke emitting chimney should be 100 m. What value is discussed in this problem? (2)
25)	The king, queen and jack of clubs are removed from a deck of 52 playing cards and are well shuffled. One card is selected from the remaining cards. Find the probability of getting (a) a heart (b) a king (c) a club (d) the '10' of hearts. (2)
26)	A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have ? Find the surface area of the solid. (2)
	Section - C **Q.Nos. 27 to 34 carry 3 marks each**
27)	Find the HCF and LCM of 510 and 92 and verify that HCF × LCM = Product of two given numbers. ***OR*** (3) Show that any positive odd integer is of the form $6q + 1$, $6q + 3$ or $6q + 5$, where q is some integer.
28)	If 7th term of an A.P. is $\frac{1}{9}$ and 9th term is $\frac{1}{7}$, find 63rd term. (3)

29) A two digit number is obtained by either multiplying the sum of digits by 8 and then subtracting 5 or by multiplying the difference of digits by 16 and adding 3. Find the number. (3)

30) If a and b are the zeroes of a quadratic polynomial such that a + b = 0 and a - b = 8. Find the quadratic polynomial having a and b as its zeroes. (3)

31) Find the co-ordinates of a point *P* on the line segment joining *A*(1, 2) and *B*(6, 7) such that $AP = \frac{2}{5}AB$.

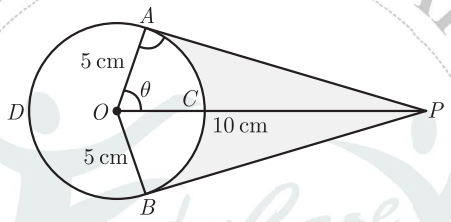
OR (3)

Find the ratio in which the line segment joining the points *A*(3, -3) and *B*(-2,7) is divided by *x*-axis. Also find the co-ordinates of point of division.

32) Given that $\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$ (3)

Find the value of : (a) $\tan 75^\circ$ and (b) $\tan 90^\circ$ by taking suitable values of *A* and *B*.

33) An elastic belt is placed around the rim of a pulley of radius 5 cm. From one point *C* on the bert, the belt is pulled directly away from the centre *O* of the pulley until it is at *P*, 10 cm from the point *O*. Find the length of the belt that is still in contact with the pulley. Also find the shaded area. (Use p = 3.14 and $\sqrt{3}$ = 1.73) (3)



34) The data regarding marks obtained by 48 students of a class in a class test is given below. Calculate the modal marks of students.

Marks obtained	0 – 5	5 - 10	10- 15	15- 20	20- 25	25- 30	30- 35	35- 40	40- 45	45- 50
Number of students	1	0	2	0	0	10	25	7	2	1

OR (3)

The following table gives the life time in days of 100 bulbs :

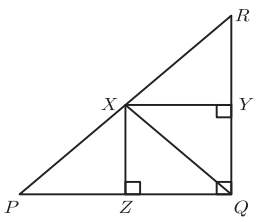
Life time in days	Less than 50	Less than 100	Less than 150	Less than 200	Less than 250	Less than 300
Number of bulbs	8	23	55	81	93	100

Change the above distribution as frequency distribution.

Section - D
Q.Nos. 35 to 40 carry 4 marks each

35) Construct a m*ABC* in which *AB* = 4 cm, *BC* = 5 cm and *AC* = 6 cm. Now, construct another triangle similar to m*ABC* such that each of its sides is two-third of the corresponding sides of m*ABC*. Also, prove your assertion. (4)

36) m*PQR* is right angled at *Q*. *QX* ⊥ *PR*, *XY* ⊥ *RQ* and *XZ* ⊥ *PQ* are drawn. Prove that $XZ^2 = PZ \times ZQ$.



	OR If the area of two similar triangles are equal, prove that they are congruent.	(4)
37)	Solve for x : $\frac{x+1}{x-1}+\frac{x-2}{x+2}=4-\frac{2x+3}{x-2}; x \neq 1,-2,2$	(4)
38)	A hemispherical bowl of internal diameter 36 cm contains a liquid. This liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of the each bottle, if 10% liquid is wasted in this transfer.	(4)
39)	The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 45°. If the tower is 30 m high, find the height of the building. ***OR*** A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of hill as 30°. Find the distance of the hill from the ship and the height of the hill.	(4)
40)	Find the median of the following data :	(4)

Class Interval	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	100 - 120	120 - 140
Frequency	6	8	10	12	6	5	3

~0~0~0~Best of Luck~0~0~0~

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