# CLASS X (2019-20)
# MATHEMATICS BASIC(241)
# SAMPLE PAPER-13

**Time : 3 Hours** **Maximum Marks : 80**

**General Instructions :**

(i) All questions are compulsory.
(ii) The questions paper consists of 40 questions divided into four sections A, B, C and D.
(iii) 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.
(iv) There is no overall choice. However, an internal choices have 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.
(v) Use of calculators is not permitted.

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## SECTION A

**Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.**

Q1. The value of $k$ for which the equations $3x-y+8=0$ and $6x-ky=-16$ represent coincident lines is [1]

(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$

(c) 2 (d) -2

Q2. Which of the following is not a quadratic equation? [1]

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

(c) $(\sqrt{2}\,x+\sqrt{3})^2+x^2=3x^2-5x$ (d) $(x^2+2x)^2=x^4+3+4x^3$

Q3. The number of two digit numbers which are divisible by 3 is [1]

(a) 33 (b) 31

(c) 30 (d) 29

Q4. In the formula $\bar{x}=a+h\left(\frac{\sum f_i u_i}{\sum f_i}\right)$, for finding the mean of grouped frequency distribution $u_i$ = [1]

(a) $\frac{x_i+a}{h}$ (b) $h(x_i-a)$

(c) $\frac{x_i-a}{h}$ (d) $\frac{a-x_i}{h}$

Q5. A card is selected at random from a pack of 52 cards. The probability of its being a red face card is [1]

(a) $\frac{3}{26}$ (b) $\frac{3}{13}$

(c) $\frac{2}{13}$ (d) $\frac{1}{2}$

Q6. If in $\Delta ABC$ and $\Delta DEF$, $\frac{AB}{DE}=\frac{BC}{FD}$, then they will be similar when [1]

(a) $\angle B=\angle E$ (b) $\angle A=\angle D$

(c) $\angle B=\angle D$ (d) $\angle A=\angle F$

Q7. If angle between two radii of a circle is 130°, the angle between the tangents at the ends of the radii is [1]

(a) 90° (b) 50°

(c) 70° (d) 40°

Q8. The value of $\frac{1-\tan^2 45^\circ}{1+\tan^2 45^\circ}$ is equal to [1]

(a) $\tan 60^\circ$ (b) $\tan 30^\circ$

(c) $\sin 45^\circ$ (d) $\tan 0^\circ$

Q9. If $\cos 9\alpha = \sin \alpha$ and $0^\circ < 9\alpha < 90^\circ$, then the value of $\tan 5\alpha$ is [1]

(a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$

(c) 1 (d) 0

Q10. The value of $\frac{\tan 60^\circ}{\cot 30^\circ} - \frac{\sin 47^\circ}{\cos 43^\circ}$ is [1]

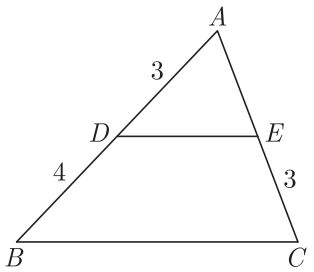
(a) 0 (b) 1

(c) $\frac{1}{2}$ (d) -1

**(Q.11-Q.15) Fill in the blanks.**

Q11. If $ax + by = a^2 - b^2$ and $bx + ay = 0$, then $(x + y)$ is equal to..... [1]

Q12. In the given figure, $DE \| BC$ and all measurements are in centimetres. The length of AE is..... [1]




Q13. PQ is a tangent to a circle at point P. Centre of circle is O. If $\Delta OPQ$ is an isosceles triangle, then $\angle QOP$ is equal to..... [1]

**OR**

The tangent at any point of a circle is..... to the radius through the point of contact.

Q14. The outcomes which ensure the occurrence is..... to the radius through the point of contact. [1]

Q15. The mode of the following frequency distribution is..... [1]

| **Marks** | 18 | 22 | 25 | 37 | 43 | 48 |
|---|---|---|---|---|---|---|
| **Number of students** | 9 | 7 | 18 | 11 | 6 | 3 |

**(Q.16-Q.20) Answer the following**

Q16. Write the polynomial whose zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$. [1]

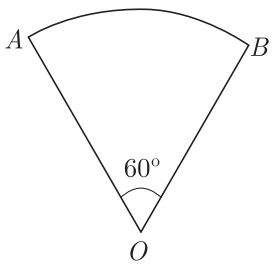
Q17. If the quadratic equation $px^2 - 2\sqrt{5}\,px + 15 = 0$ has two equal real roots, then find the value of $p$. [1]

**OR**

Which term of the arithmetic progression 4,9,14,19 ..... is 109?

Q18. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of larger circle (in cm) which touches the smaller circle. [1]

Q19. If the adjoining figure is a sector of a circle of radius 10.5 cm, find the perimeter of the sector. $\left(Take\ \pi = \frac{22}{7}\right)$. [1]



Q20. Find the value of a, if the distance between the points $A(-3,-14)$ and $B(a,-5)$ is 9 units. [1]

## SECTION B

Q21. Show that any positive odd integer is of the form $4q+1$ or $4q+3$, where $q$ is some integer. [2]

Q22. The coordinates of the mid-point of the line joining the points $(3p,4)$ and $(-2,2q)$ are $(5,p)$. Find the values of $p$ and $q$. [2]

**OR**

If the points $P(5,3)$ and $Q(k,4)$ are on a circle centre $O(2,-1)$, find the value of $k$.

Q23. If the total surface area of a solid hemisphere is $462\,\text{cm}^2$, find its volume. $\left[Take\ \pi=\frac{22}{7}\right]$. [2]

Q24. If $4\cos\theta = 11\sin\theta$, find the value of $\frac{11\cos\theta-7\sin\theta}{11\cos\theta+7\sin\theta}$

**OR**

If $\cos\theta=\frac{\sqrt{3}}{2}$, then find the value of $4\cos^3\theta-3\cos\theta$.

Q25. If an equilateral triangle ABC, AD is drawn perpendicular to BC meeting BC in D. Prove that $AD^2=3BD^2$. [2]

Q26. The in circle of an isosceles triangle ABC,in which $AB=AC$, touches the sides BC, CA and AB at D,E and F respectively. Prove that $BD=DC$ [2]

## SECTION C

Q27. Find the largest number that divides 2053 and 967 and leaves a remainder of 5 and 7 respectively. [3]

Q28. Solve graphically the pair of linear equations $2x+3y=11$ and $2x-4y=-24$. Hence, find the value of $m$, given that the line represented by $y=mx+3$ passes through the intersection of the given pair. [3]

Q29. Find the sum of all two digit numbers which when divided by 3 yield 1 as remainder. [3]

**OR**

The sum of 4th and 8th terms of an AP is 24 and the sum of 6th and 10th terms is 44. Find the AP.

Q30. Find the mean of the following frequency distribution: [3]

| **Class interval** | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
|---|---|---|---|---|---|
| **Frequency** | 8 | 12 | 10 | 11 | 9 |

Q31. Prove that the points $A(2,3)$, $B(-2,2)$, $C(-1,-2)$ and $D(3,-1)$ are the vertices of a square ABCD. [3]

Q32. Draw a line segment of length $7.8\,\text{cm}$ and divide it in the ratio 5:8. Measure the two parts. Also, justify your construction. [3]

Q33. Prove the following identity:$\frac{\tan A}{1+\sec A}-\frac{\tan A}{1-\sec A}=2\,\text{cosec}\,A$. [3]

**OR**

Prove that $(\text{cosec}\,A-\sin A)\,(SecA-\cos A)=\frac{1}{\tan A+\cot A}$

Q34. A toy is in the form of a cone of base radius $3.5\,\text{cm}$ mounted on a hemisphere of base diameter $7\,\text{cm}$ [3]

**OR**

A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of each bottle, if 10% liquid is wasted in this transfer.

# SECTION D

Q35. Ram's mother has given him money to buy some boxes from the market at the rate of $4x^2+3x-2$. The total amount of money given by his mother is represented by $8x^4+14x^3-2x^2+7x-8$. Out of this money he donated some amount of money to a child who was studying in the light of street lamp. Find how much amount of money he donated after purchasing the maximum number of boxes from the market? [4]

Q36. A student scored a total of 32 marks in class tests in mathematics and science. Had he scored 2 marks less in science and 4 more in mathematics, the product of his marks would have been 253. Find his marks in two subjects. [4]

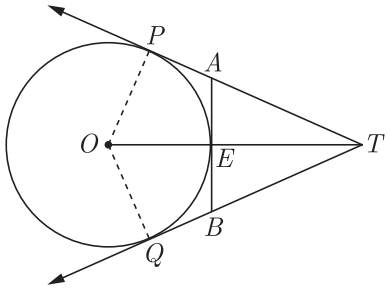
**OR**

If -4 is a root of the equation $x^2+2x+4p=0$, find the values of $k$ for which the equation $x^2+p(1+3k)x+7(3+2k)=0$ has equal roots.

Q37. Through the mid-point M of the side CD of a parallelogram ABCD, the line BM is drawn intersecting AC at L and AD produced in E. Prove that $EL=2BL$. [4]

**OR**

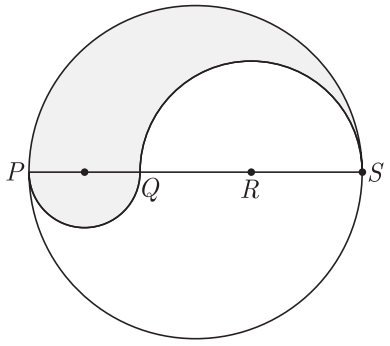
In the given figure, O is the centre of a circle or radius 5 cm. T is a point such that $OT=13\,\text{cm}$, PT and QT are tangents to the circle at points P and Q respectively. OT intersects the circle at the point E. If AB is tangent to the circle at E, find the length of AB.




Q38. A vertical tower stands on a horizontal plane and is surmounted by a vertical flag staff of height $h$. At a point on the plane, the angles of elevation of the bottom and the top of the flagstaff are $\alpha$ and $\beta$ respectively. Prove that the height of the tower is $\frac{h\tan\alpha}{\tan\beta-\tan\alpha}$ [4]

Q39. PS is a diameter of a circle of radius 6 cm. Q and R are points on the diameter that PQ, QR and RS are equal. Semicircles are drawn with PQ and QS as diameters, as shown in the figure. Find the perimeter of the shaded region. [4]

Also find the area of the shaded region. $(\text{USe } \pi=3.14)$




Q40. A die has six faces marked 0,1,1,1,6,6. Two such dice are thrown together and the total score is recorded. [4]

(i) How many different scores are possible?
(ii) What is the probability of getting a total of 7?

**OR**

Two customers Shyam and Ekta visit a particular shop in the same week from Tuesday to Saturday. Each is equally likely to visit the shop on any day. Find the probability that they visit the shop
(i) on the same day
(ii) on consecutive day
(iii) on different days
(iv) neither on same day nor on consecutive days.