



THE INDIAN HIGH SCHOOL, DUBAI

PERIODIC TEST-3 2024-25

DATE: 18.11.2024

GRADE :10

MATHEMATICS

Duration : 3 hours

Marks : 80

General Instructions:

1. This Question Paper has 5 Sections A-E
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 1 question of 2 marks, 3 marks and 5 marks each has been provided.
8. Draw neat figures wherever required.

SECTION - A

Section A consists of 20 questions of 1 mark each.

1. If one of the zeroes of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is
 a) 10 b) -10 c) -7 d) -2
2. The pair of linear equations $x + 2y + 5 = 0$ and $-3x = 6y - 1$ has
 a) unique solution b) exactly two solutions c) infinitely many solutions d) no solution
3. If -4 is a root of the quadratic equation $2x^2 + px - 12 = 0$, then the value of p is
 a) 5 b) 4 c) 8 d) 2
4. If one zero of polynomial $(k^2 + 16)x^2 + 13x + 8k$ is reciprocal of the other, then value of k is
 a) -4 b) 4 c) 12 d) 7
5. The value of p for which $(2p+1), 10$ and $(5p+5)$ are three consecutive terms of an AP.
 a) 1 b) 2 c) -1 d) -2
6. ΔABC is such that $AB = 3\text{cm}$, $BC = 2\text{cm}$, $CA = 2.5\text{cm}$. If $\Delta ABC \sim \Delta DEF$ and $EF = 4\text{cm}$, then perimeter of ΔDEF is
 a) 7.5cm b) 15cm c) 22.5cm d) 30cm.
7. The perimeter of a triangle with vertices $(0,4)$, $(0,0)$ and $(3,0)$ is
 a) 5 b) 12 c) 11 d) $7 + \sqrt{2}$
8. The value of $(\sec\theta + \tan\theta)(1 - \sin\theta)$ is
 a) $\sec\theta$ b) $\sin\theta$ c) $\cos\theta$ d) $\text{cosec}\theta$
9. The length of tangent drawn to a circle of radius 9cm from a point 41cm from the centre is
 a) 40cm b) 9cm c) 41cm d) 50cm

$$\begin{aligned} (2)^2 + 3 \times 2 + k &= 0 \\ 4 + 6 + k &= 0 \\ k + 10 &= 0 \\ k &= -10 \end{aligned}$$

$$-\frac{1}{3} = \frac{2p-12}{-8}$$

$$\begin{array}{r} 191 \\ +91 \\ \hline 282 \\ +169 \\ \hline 451 \\ -161 \\ \hline 290 \\ -81 \\ \hline 209 \end{array}$$

$$\begin{array}{r} 191 \\ +81 \\ \hline 272 \\ +90 \\ \hline 362 \end{array}$$

- A. Both assertion (A) and reason (R) are true, and reason (R) is the correct explanation of assertion (A)
- B. Both assertion (A) and reason (R) are true, and reason (R) is not the correct explanation of assertion (A)
- C. Assertion (A) is true, but reason (R) is false.
- D. Assertion (A) is false, but reason (R) is true.

19. Assertion (A) : For two positive integers a and b, $HCF(a, b) \times LCM(a, b) = ab$.

Reason (R) : LCM of two numbers is 40, their HCF is 5 and their product is 150.

20. Assertion (A) : Area of a quadrant of a circle of radius 12 cm is $36\pi \text{ cm}^2$.

Reason (R) : Area of a quadrant of a circle is $\frac{1}{4}$ of area of circle.

SECTION - B

Section B consists of 5 questions of 2 marks each.

21. Prove that $3 + 2\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is an irrational number.

OR

Check whether 6^n can end with the digit 0 for any natural number n.

22. Find a point on the y-axis which is equidistant from the points A (6,5) and B (-4,3).

23. If $\sin(A - B) = \frac{1}{2}$ and $\cos(A + B) = \frac{1}{2}$, $0^\circ < A + B < 90^\circ$ and $A > B$, then find the values of A and B.

24. If A(1, 2), B(4, y), C(x, 6) and D(3, 5) are vertices of a parallelogram taken in order, find the value of x and y.

25. A box contains 20 balls bearing numbers 1, 2, 3, 4, 5, 20. A ball is drawn at random from the box, what is the probability that the number on the ball is

- a) An odd number $\frac{1}{2}$
- b) Divisible by 2 or 3. $\frac{13}{20}$

SECTION-C

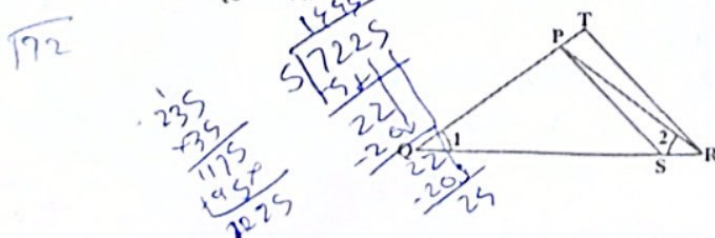
Section C consists of 6 questions of 3 marks each.

26. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 81 and 108 respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject.

27. If α and β are zeroes of a polynomial $6x^2 - 5x + 1$ then form a quadratic polynomial whose zeroes are α^2 and β^2 .

28. A train travels 360km at a constant speed. If the speed of the train is increased by 5km/h, the journey will take 1 hour less. Find the speed of the train.

29. In the figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Show that $\Delta PQS \sim \Delta TQR$.



Handwritten calculations for questions 19 and 20:

$$\frac{225}{125} = \frac{225 \div 25}{125 \div 25} = \frac{9}{5}$$

$$\frac{40}{5} = \frac{40 \div 5}{5 \div 5} = \frac{8}{1}$$

$$\frac{40}{5} \times \frac{3}{1} = \frac{120}{5} = 24$$

$$36\pi$$

Handwritten calculations for question 22:

$$\frac{21800}{31400} = \frac{218}{314} = \frac{109}{157}$$

Handwritten calculations for question 23:

$$\frac{57225}{51445} = \frac{57225 \div 25}{51445 \div 25} = \frac{2289}{2057.8}$$

Handwritten calculations for question 24:

$$\frac{13}{25} = \frac{13 \times 4}{25 \times 4} = \frac{52}{100}$$

Handwritten calculations for question 25:

$$\frac{13}{20} = \frac{13 \times 5}{20 \times 5} = \frac{65}{100}$$

Handwritten calculations for question 26:

$$\frac{1300}{100} = 13$$

$$\frac{810}{90} = 9$$

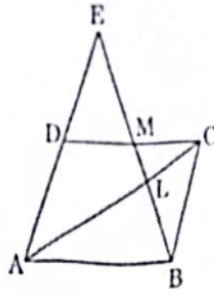
$$\frac{16}{4} = 4$$

Handwritten calculations for question 27:

$$\frac{319}{72} = \frac{319 \div 11}{72 \div 11} = \frac{29}{6.545}$$

OR

In the given figure, ABCD is a parallelogram. BE bisects CD at M and intersects AC at L. prove that EL = 2BL.



30. If $\sin\theta + \cos\theta = p$ and $\sec\theta + \operatorname{cosec}\theta = q$, show that $q(p^2 - 1) = 2p$.

OR

Prove that $\sqrt{\frac{\operatorname{cosec}\theta - 1}{\operatorname{cosec}\theta + 1}} + \sqrt{\frac{\operatorname{cosec}\theta + 1}{\operatorname{cosec}\theta - 1}} = 2 \sec\theta$

sec + cosec

31. A chord of a circle of radius 10cm subtends a right angle at the centre. Find the area of the minor segment and area of the major sector. ($\pi = 3.14$).

OR

In a circle of radius 21cm, an arc subtends an angle of 60° at the centre.

- a) Find the length of the arc. 22
- b) Find area of sector formed by the minor arc.

Handwritten calculations:
 $\frac{22}{7} \times 2\pi r \times \frac{1}{6}$
 $\frac{22}{7} \times 21 \times \frac{1}{6}$

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. A train covered a certain distance at uniform speed. If the train would have been 10km/h faster, it would have taken 2 hours less than the scheduled time. And, if the train were slower by 10km/h, it would have taken 3 hours more than the scheduled time. Find the distance covered by the train.

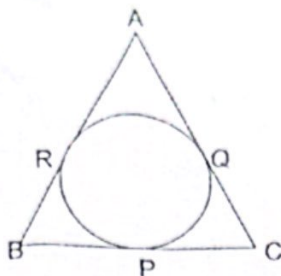
OR

The taxi fare charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 8km, the charge paid is Rs 111, and for the journey of 12km, the charge paid is Rs 159. What are the fixed charges and the charge per km? How much does a person have to pay for traveling a distance of 5km?

33. An airplane at an altitude of 1200 meters finds that two ships are sailing towards it in same direction. The angles of depression of the ships as observed from the aeroplane are 60° and 30° respectively. Find the distance between the two ships. ($\sqrt{3} = 1.732$)

34. Prove that the lengths of tangents drawn from an external point to a circle are equal. Using the above result, find the length BC of ΔABC . Given that, a circle is inscribed in ΔABC touching the sides AB, BC and CA at R, P and Q respectively and AB = 10 cm, AQ = 7cm CQ = 5cm.

Handwritten calculations:
 $159 - 111 = 48$
 $\frac{22 \times}{7}$
 $A 2395678910KQJ \times 9$
 $\frac{1231}{29} = 924$



35. The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality. Find the median of the data.

Monthly consumption (in units)	Number of consumers
65-85	4
85-105	5
105-125	13
125-145	20
145-165	14
165-185	8
185-205	4

SECTION – E

Section E consists of 3 questions of 4 marks. Case-study based questions are compulsory

36. Manpreet Kaur is the national record holder for women in the short-put discipline. Her throw of 18.86m at the Asian Grand Prix in 2017 is the biggest distance for an Indian female athlete.



Handwritten calculation: $18.86 + 0.02 = 18.88$

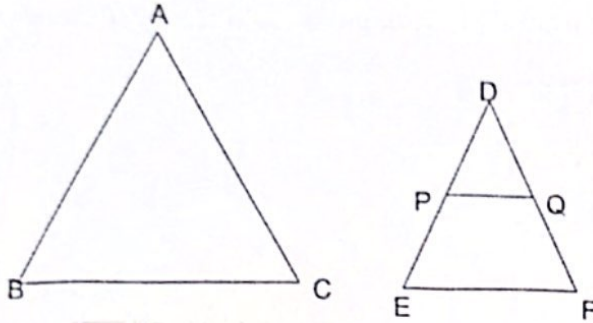
Keeping her as a role model, Sanjitha is determined to earn gold in the Olympics one day. Initially her throw reached 7.56m only. Being an athlete in school, she regularly practiced both in the mornings and in the evenings and was able to improve the distance by 9cm every week. During the special camp for 15 days, she started with 40 throws and every day kept increasing the number of throws by 12 to achieve this remarkable progress.

- 1) How many throws sanjitha practiced on 11th day of the camp?
- 2) How many throws did she do during the entire camp of 15 days?
- 3) what would be sanjitha's throw distance at the end of 6 weeks? 8.01

OR

When will she be able to achieve a throw of 11.16m?

37. Triangle is a very popular shape used in interior designing. The picture given above shows a cabinet designed by a famous interior designer. Here the largest triangle is represented by $\triangle ABC$ and smallest one with shelf is represented by $\triangle DEF$. PQ is parallel to EF.

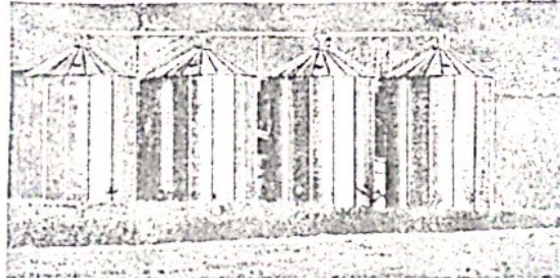


- 1) Show that $\triangle DPQ \sim \triangle DEF$.
- 2) If $DP = 50$ cm and $PE = 70$ cm, then find $\frac{PQ}{EF}$.
- 3) If $2AB = 5DE$ and $\triangle ABC \sim \triangle DEF$, then show that $\frac{\text{perimeter}(ABC)}{\text{perimeter}(DEF)}$ is constant.

OR

If AM and DN are medians of triangles ABC and DEF respectively then prove that $\triangle ABM \sim \triangle DEN$.

38. Metallic silos are used by farmers for storing grains. Farmer Girdhar has decided to build a new metallic silo to store his harvested grains. It is in the shape of a cylinder mounted by a cone.



Handwritten calculations:
 225
 225
 $\frac{132000}{375}$

Dimensions of the conical part of a silo is as follows: Radius of base = 1.5 m Height = 2 m
 Dimensions of the cylindrical part of a silo is as follows: Radius = 1.5 m Height = 7 m
 On the basis of the above information answer the following questions.

- 1) Calculate the slant height of the conical part of one silo.
- 2) Find the curved surface area of the conical part of one silo. (1.775)
- 3) Find the cost of metal sheet used to make the curved cylindrical part of 1 silo at the rate of ₹2000 per m^2 . 132000

OR

Find the total capacity of one silo to store grains.

		0	30	45	60	90
Sin	θ	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	0
Tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	N.D	N.D