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|  |  | **MATHEMATICS**  **Class – X**    **Time allowed : 3 hours Maximum Marks : 90**  **General Instructions :**  (i) All questions are **compulsory**.  (ii) The question paper consists of **31**questions divided into four **sections A, B, C** and **D**. **Section-A** comprises of **4** questions of **1 mark** each, **Section-B** comprises of **6** questions of **2 marks** each, **Section-C** comprises of **10** questions of **3 marks** each and **Section-D** comprises of **11** questions of **4 marks** each.  (iii) There is no overall choice.  (iv) Use of calculator is not permitted. |  |
|  |  | **SECTION-A**  Question numbers **1** to **4** carry **one** mark each. |  |
|  | 1 | Find sum of 10 terms of following A.P. :  …. | 1 |
|  | 2 | The ratio of the length of a rod and its shadow is . What is the angle of elevation of the source of light ? | 1 |
|  | 3 | A die is thrown once. Find the probability of getting "at most 2." | 1 |
|  | 4 | The mid point of the line segment joining (3m, 6) and (-4, 3n) is (1, 2m1). Find the value of n. | 1 |
|  |  | **SECTION-B**  Question numbers **5** to **10** carry **two** marks each. |  |
|  | 5 | How many multiples of 4 lie between 10 and 260 ? | 2 |
|  | 6 | Find two consecutive natural numbers whose product is 20. | 2 |
|  | 7 | The angle between two tangents drawn from a point P to a circle of radius ‘a’ and centre O is 90. Find OP. | 2 |
|  | 8 | To construct a ABC similar to PQR with the sides times the corresponding sides of PQR draw a ray BX such that  is an acute angle. How many points will be marked on the ray BX at equal distances and also write whether the new triangle will lie inside or outside the original triangle. | 2 |
|  | 9 | Geometrically obtain the point P on the line segment AB =7cm such that = | 2 |
|  | 10 | Untitled art 1.jpg  In the given figure, OAPB is a sector of a circle of radius 3.5 cm with the centre at O. If ∠AOB=1200, then find the length of OAPBO. | 2 |
|  |  | **SECTION-C**  Question numbers **11** to **20** carry **3** marks each. |  |
|  | 11 | Find the sum of all natural numbers between 1000 and 10000. | 3 |
|  | 12 | If (5) is a root of the quadratic equation 2*x*2+p*x*-15=0 and the quadratic equation p(*x*2+*x*)+ k=0 has equal roots, then find the value of p and k. | 3 |
|  | 13 | If PA and PB are two tangents drawn to a circle with centre O such that ∠BPA120, prove that OP2PB. | 3 |
|  | 14 | The horizontal distance between two towers is 60 m. The angle of elevation of the top of the taller tower as seen from the top of the shorter one is 300. If the height of the taller tower is 150 m, then find the height of the shorter tower. | 3 |
|  | 15 | Answer the questions given below.  (a) What is the probability of a sure event ?  (b) If the probability of having rain today is 0.71, what is the probability of not having rain ?  (c) What is the probability of getting a multiple of 7 when a fair die is rolled ? | 3 |
|  | 16 | If the distance of P(*x*, *y*) from A(6, 2) and B(-2, 6) are equal, prove that *y*=2*x*. | 3 |
|  | 17 | Show that quadrilateral PQRS formed by vertices P(-2, 5), Q(7, 10), R(12, 11) and S(3, -4) is not a parallelogram | 3 |
|  | 18 | A largest right circular cone is made out of a solid cube of edge 9 cm. Find the volume of the remaining solid. | 3 |
|  | 19 | A momento is made as shown in the figure. Its base PBCR is silver plated from the front side. Find the area which is silver plated.  9 | 3 |
|  | 20 | The diameter of a metallic sphere is 6 cm. The sphere is melted and drawn into long wire of uniform circular cross-section. If the length of wire is 36 cm, find its radius. | 3 |
|  |  | **SECTION-D**  Question numbers **21** to **31** carry **4** marks each. |  |
|  | 21 | If pth, qth and rth terms of an A.P are a,b and c respectively, then show that : a (q─r) b (r─p) c (p─q) = 0 | 4 |
|  | 22 | Solve for *x* :  = – 3, x ≠ 0,- | 4 |
|  | 23 | Solve : + = ; *y* ≠ 3, 4. | 4 |
|  | 24 | Tangents PQ and PR are drawn to a circle such that ∠RPQ = 300. A chord RS is drawn parallel to the tangent PQ. Find ∠RQS. | 4 |
|  | 25 | Draw a circle of radius 3 cm. Take two points A and B on one of its extended diameters each at a distance of 6 cm from its centre. Draw tangents to the circle from these two points A and B. | 4 |
|  | 26 | If a flag-staff of 6 metres height placed on the top of a tower throws a shadow of 2 metres along the ground, then find the sun’s altitude. | 4 |
|  | 27 | In a hospital, there are 200 beds for patients. Of these, 120 are occupied by males and remaining by females. 20% of the males and 40% of the females are suffering from malaria and rest of them from dengue. If a patient is selected at random, find the probability that he/she is a  (A) female patient.  (B) male patient.  (C) male patient suffering from malaria.  (D) female patient suffering from dengue. | 4 |
|  | 28 | Show that A(1, 0), B(0, 1), C(1, 2) and D(2, 1) are vertices of a parallelogram ABCD. Is ABCD a rectangle ? | 4 |
|  | 29 | A wall 24 m long, 0.4 m thick and 6 m high is constructed with bricks each of dimensions 25 cm×16cm×10 cm. If the mortar occupies  of the volume of the wall, find the number of bricks used in constructing the wall. | 4 |
|  | 30 | 12 copy  A model of a traffic signal on the road has a triangular base ABC with ∠A =90o and with a red circular light within it as shown in the figure. If AB=12 cm and BC=20 cm and R is the incentre of the ΔABC, find the area used for the red light. | 4 |
|  | 31 | A school thought to collect the rainwater from the roof of the building, whose dimensions are 22 m×20 m by draining into a cylindrical vessel having diameter 7 m and height 4.2 m. If the vessel is just full, find the rainfall recorded in cm.  Why it is necessary to conserve water by doing these type of activities ? | 4 |
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