12-12-15_Sr.IPLCO_Jee-Main_RPTM-14_ Syllabus

MATHS:

Complete Properties of Triangles and Inverse Trigonometric Functions

PHYSICS

Geometrical & Wave Optics

Experiments:

1. Focal length of (i) Convex mirror

(ii) Concave mirror, and (iii) convex lens using parallax method.

2. Plot of angle of deviation vs angle of incidence for a triangular prism.

3. Refractive index of a glass slab using a travelling microscope.

CHEMISTRY

States of Matter, Solid State, Chemical Kinetics

MATHS

61. In a triangle ABC, AC = 4, BC =5, AB = 6. A point E is taken on AB such that $AE = \frac{1}{2}(EB)$ then CE = ___________

1) $\frac{\sqrt{11}}{2}$ 2) $\frac{3\sqrt{11}}{2}$ 3) $\sqrt{11}$ 4) $\frac{2\sqrt{11}}{3}$

62. AB is diameter of a circle of radius 1-unit CD is a chord perpendicular to AB that cuts AB at E. If the arc CAD is $\frac{2}{3}$ of circumference of the circle then AE = ___________

1) $\frac{1}{2}$ 2) $\frac{3}{2}$ 3) $\frac{5}{2}$ D) $\frac{7}{2}$

63. If h_1, h_2, h_3 are lengths of altitude of a triangle ABC, r is inradius of $\Delta^{le}ABC$ then minimum value of $\frac{h_1 + r}{h_1 - r} + \frac{h_2 + r}{h_2 - r} + \frac{h_3 + r}{h_3 - r}$ is

1) 12 2) 4 3) 3 4) 6

64. Δ^{le}ABC is an isosceles triangle with $AC = CB, \angle ABD = \frac{\pi}{3}, \angle BAE = 50^0$, $\angle C = 20^0$ then $\angle EDB =$ ______ (Here D is a point on AC, E is a point on BC)

1) 20^0 2) 30^0 3) 45^0 4) 55^0

65. In a Δ^{le}ABC, $AB = 20, AC = \frac{45}{2}, BC = 27$. Point X and Y are taken on AB and AC respectively so that $AX = AY$. If Area of $\Delta^{le} AXY = \frac{1}{2}$(Area of Δ^{le} ABC) then $AX =$ _____

1) $\frac{45}{4}$ 2) $\frac{15}{2}$ 3) 15 4) $\frac{15}{4}$

66. In a Δ^{le}ABC, AB = 13, BC = 14, CA = 15. F is a point on AC such that perpendicular drawn from F to the side BC, meets BC at E and EF divides Δ^{le} ABC, into two regions of equal areas then EF=___________

1) $\sqrt{7}$ 2) $2\sqrt{7}$ 3) $3\sqrt{7}$ 4) $4\sqrt{7}$

67. Altitude AD of an equilateral triangle ABC is a diameter of circle. If this circle intersect the sides AB and AC at E and F then $\frac{EF}{BC}=$

1) $\frac{1}{2}$ 2) $\frac{1}{4}$ 3) $\frac{3}{4}$ 4) $\frac{3}{8}$

68. In a $\Delta^{le}ABC$, the bisector of $\angle B$ and $\angle C$ meet AC and AB at D and E respectively BD and EC intersect at O. If OD = OE and $\angle B \neq \angle C$ and $\angle BAC =$

1) 30^0 2) 60^0 3) 45^0 4) $\left(\frac{45}{2}\right)^0$

69. In a triangle ABC if $A-B=120^0$ and $R=8r$ then $\cos C=$

1) $\frac{1}{8}$ 2) $\frac{3}{8}$ 3) $\frac{5}{8}$ 4) $\frac{7}{8}$

70. In a triangle ABC if $\frac{a}{b}=2+\sqrt{3}$ and $\angle C=60^0$ then

1) $\angle A=105^0, \angle B=15^0$ 2) $\angle A=60^0, \angle B=60^0$

3) $\angle A=30^0, \angle B=90^0$ 4) $\angle A=45^0, \angle B=75^0$

71. In any triangle ABC the maximum value of $\frac{a^2+b^2+c^2}{R^2}$ is

1) 3 2) 6 3) 9 4) 8

72. In a triangle ABC if $\left(\cot\frac{A}{2}\right)^2+4\left(\cot\frac{B}{2}\right)^2+9\left(\cot\frac{C}{2}\right)^2=\left(\frac{6s}{7r}\right)^2$ then the ratio of sides $a:b:c=$

1) $3:4:5$ 2) $2:3:5$ 3) $1:1:\sqrt{2}$ 4) $13:40:45$

73. If the lengths of medians of a triangle ABC are 6, 8, 10 then area of triangle ABC is

1) 16 sq.units 2) 24 sq.units 3) 32 sq.units 4) 48 sq.units

74. In the triangle ABC, D is on the side AC such that AD = BC, BD = DC $\angle DBC=2\theta, \angle BAD=3\theta$ then $\theta=$ ______

1) $\frac{\pi}{2}$ 2) $\frac{\pi}{6}$ 3) $\frac{\pi}{12}$ 4) $\frac{\pi}{18}$

75. In a triangle ABC if $r_1 = 2r_2 = 3r_3$ D is mid point of BC and if $\angle ADC = \theta$ then $\cos\theta =$

1) $\frac{7}{25}$ 2) $\frac{-7}{25}$ 3) $\frac{3}{25}$ 4) $\frac{-3}{25}$

76. If radius of a circle which is inscribed in an Isosceles triangle with maximum angle 120^0 is $\sqrt{3}$ then area of Δ^{le} is_________

1) $12+7\sqrt{3}$ sq.units 2) $12-7\sqrt{3}$ sq.units

3) $12+5\sqrt{3}$ sq.units 4) $12-5\sqrt{3}$ sq.units

77. In a triangle ABC if $r=1, R=3, \Delta=7$ then $\sum\left(\frac{\cos A}{a}\right)=$

1) $\frac{1}{7}$ 2) $\frac{2}{7}$ 3) $\frac{3}{7}$ 4) $\frac{4}{7}$

78. In a triangle ABC, $\angle C = 90^0$ and $\tan A = \frac{\sqrt{\sqrt{5}-1}}{2}$ then a,b,c are

1) in A.P 2) in G.P 3) in H.P 4) satisfying a + c = b

79. In a triangle ABC if $\angle B = \frac{\pi}{3}$ and $x = \sin A.\sin C$ then range of x is

1) $(0,1)$ 2) $\left[\frac{1}{2},1\right)$ 3) $\left[\frac{1}{4},\frac{3}{4}\right]$ 4) $\left(0,\frac{3}{4}\right]$

80. The lengths of medians of a right angled triangle through its acute angles are 3 and 4 then area of triangle is

1) $\frac{2\sqrt{11}}{3}$ 2) $\frac{4\sqrt{11}}{3}$ 3) $\frac{3\sqrt{11}}{4}$ 4) $\frac{5\sqrt{11}}{3}$

81. The number of ordered pairs (x,y) satisfying $y = |\cos x|$ and $y = \cos^{-1}(\cos x)$ in $[-2\pi, 2\pi]$ is

1) 2 2) 4 3) 6 4) 8

82. In a $\Delta^{le} ABC, \angle A = \angle B = \frac{1}{2}\left(\sin^{-1}\left(\frac{\sqrt{6}+1}{2\sqrt{3}}\right) + \sin^{-1}\left(\frac{1}{\sqrt{3}}\right)\right)$ and $C = 6\left(3^{1/4}\right)$ then area of Δ^{le}ABC is

1) 9 sq.units 2) 18 sq.units 3) 27 sq.units 4) 54 sq.units

83. If $\left(\sin^{-1}x\right)^3+\left(\cos^{-1}x\right)^3=\alpha.\pi^3$ where α is real then range of α is

1) $\left[\frac{1}{32},\frac{7}{8}\right]$ 2) $\left[\frac{1}{8},\frac{7}{8}\right]$ 3) $\left[\frac{1}{32},\frac{7}{32}\right]$ 4) $\left[\frac{1}{16},\frac{7}{8}\right]$

84. $\sin^{-1}x>\cos^{-1}x$ then range of x is

1) $\left(-1,\frac{-1}{\sqrt{2}}\right)$ 2) $\left(0,\frac{1}{\sqrt{2}}\right)$ 3) $\left(\frac{1}{\sqrt{2}},1\right]$ 4) $\left(\frac{-1}{\sqrt{2}},0\right)$

85. Number of value of x for which $\tan\{x\}=\cot\{x\}$ where $\{\bullet\}$ represents fractional part of $x, x\in[0,2\pi]$

1) 12 2) 7 3) 8 4) 6

86. The range of x for which $4\left(\cot^{-1}x\right)^2-16\left(\cot^{-1}x\right)+15\le 0$

1) $\left[\cot\frac{5}{2},\cot\frac{3}{2}\right]$ 2) $\left[-\cot\frac{3}{2},-\cot\frac{5}{2}\right]$ 3) $[0,1]$ 4) $\mathbb{R}$

87. A triangle is inscribed in a circle such that the vertices of the triangle divide the circumference of circle into 3-arcs of lengths 3, 4, 5 then area of the triangle is

1) $\dfrac{9\left(\sqrt{3}+1\right)}{\pi^2}$sq.units 2) $\dfrac{9\sqrt{3}\left(\sqrt{3}+1\right)^2}{\pi^2}$sq.units

3) $\dfrac{\left(\sqrt{3}+1\right)^2}{\pi^2}$sq.units 4) $\dfrac{9\left(\sqrt{3}+1\right)\sqrt{3}}{\pi^2}$sq.units

88. In a triangle ABC if $a^2+c^2=2015b^2$ then $\dfrac{\cot A+\cot C}{\cot B}=$

1) $\dfrac{2}{2015}$ 2) $\dfrac{2}{2014}$ 3) $\dfrac{2}{2016}$ 4) $\dfrac{2}{2013}$

89. If the median AD of a triangle ABC is perpendicular to AB then $\dfrac{\tan A}{\tan B}=$ ____

1) 1 2) -1 3) 2 4) -2

90. A Δ^{le} ABC has sides 6, 7, 8. The line through its incentre parallel to shortest side is drawn to meet the other two sides at P and Q then PQ=

1) $\dfrac{30}{7}$ 2) 5 3) $\dfrac{15}{4}$ 4) 3