Chap # 02 (VECTORS & SCALARS)

1. Two vectors $\vec{A}$ and $\vec{B}$ are such that $|\vec{A}| = 4$, and $|\vec{B}| = 6$ and $\vec{A} . \vec{B} = 13.5$. Find the magnitude of difference of vectors and the angle b/w $\vec{A}$ and $\vec{B}$. **(2019)**

55.77^0

2. if the vector $\vec{A} = a\hat{\imath} + \hat{\jmath} - 2\hat{k}$ and $\vec{B} = \hat{\imath} + a\hat{\jmath} + \hat{k}$ are perpendicular to each other, then find the value of "a". **(2018)**

1

3. If , $\vec{A} = 2\hat{\imath} - 6\hat{\jmath} - 3\hat{k}$ and $\vec{B} = 4\hat{\imath} + 3\hat{\jmath} - \hat{k}$, find a unit vector perpendicular to the plane of $\vec{A}$ and $\vec{B}$.

$\vec{C} = \frac{3}{7}\hat{\imath} - \frac{2}{7}\hat{\jmath} + \frac{6}{7}\hat{k}$ **(2017, 11)**

4. Determine the unit vector perpendicular to the plane of $\vec{A} = 3\hat{\imath} + 4\hat{\jmath} - \hat{k}$ and $\vec{B} = 4\hat{\imath} + 3\hat{\jmath} - 2\hat{k}$ vectors. **(2016)**

$\vec{\mathbf{C}} = -\frac{5}{\sqrt{78}}\hat{\mathbf{i}} + \frac{2}{\sqrt{78}}\hat{\mathbf{j}} - \frac{7}{\sqrt{78}}\hat{\mathbf{k}}$

5. if two sides of a triangle are formed by vectors $\vec{A} = 3\hat{\imath} + 6\hat{\jmath} - 2\hat{k}$and $\vec{B} = 4\hat{\imath} - \hat{\jmath} + 3\hat{k}$. Determine the area of the triangle. **(2015)**

$\Delta = 17.847\ square\ unit$

6. Determine the unit vector perpendicular to the plane containing $\vec{A}$ and $\vec{B}$. if $\vec{A} = 2\hat{\imath} - 3\hat{\jmath} - \hat{k}$, $\vec{B} = \hat{\imath} + 4\hat{\jmath} - 2\hat{k}$ **(2014)**

$\vec{\mathbf{C}} = \frac{10}{\sqrt{230}}\hat{\mathbf{i}} - \frac{3}{\sqrt{230}}\hat{\mathbf{j}} + \frac{11}{\sqrt{230}}\hat{\mathbf{k}}$

7. prove that $|\vec{A} \times \vec{B}|^2 + (\vec{A} \cdot \vec{B})^2 = A^2B^2$ **(2014,13)**

8. $\vec{A} = 3\hat{\imath} + \hat{\jmath} - 2\hat{k}$ and $\vec{B} = -\hat{\imath} + 3\hat{\jmath} + 4\hat{k}$, find the projection of $\vec{A}$ and $\vec{B}$. **(2013)**

$-\frac{8}{\sqrt{26}}$

9. Two vectors are such that $|\vec{A}| = 4$, and $|\vec{B}| = 6$ and $|\vec{A}|$ and $|\vec{A} - \vec{B}| = 5$, find $|\vec{A} + \vec{B}|$ **(2012)**

$\sqrt{79}$

10. If one of the rectangular components of force of 50 N is 25 N. Find the value of the other. **(2010)**

43.30 N

Chap # 03 (MOTION)

11. A body starts from rest and moves with constant acceleration 10 m/s^2 . How much distance will it travel in the 4^{th} sec of its motion. **(2019)**

35 m

12. A 50 gm bullets is fired into 10 kg wooden block that is Suspended by a long so that it can swing as a pendulum. If the block is displaced so that its center of gravity rises by 10cm, what is the speed of bullet? **(2019,11)**

281.4 m/s

13. A brick of mass 2 kg is dropped form a height of 5 m above the Ground. what is its velocity at a height of 3 m above the ground? **(2018)**

6.26 m/s

14. A balloon tied up with a wooden piece is moving upward with velocity of 15 m/s. At a height of 300 m above the ground, the wooden piece detached from the balloon How much time will it take to reach the ground. **(2018)**

9.5 Sec

15. A car starts from rest and moves and moves with a constant acceleration During the 5^{th} seconds of its motion, it covers a distance of 36 m Calculate: Acceleration of the car and Distance covered by the car during this time. **(2016)**

8 m/s^2, 100 m

16. A 100 g bullet is formed from a 10 kg gun with a speed of 1000 m/s. What is speed of recoil of the gun? **(2015)**

-10 m/s

17. A car starts from rest and moves with a constant acceleration. During the 4^{th} seconds of its motion, it covers a distance of 24 m Calculate the Acceleration of the car and total distance of covered by the car during this time. **(2014)**

6.8571 m/s^2, 54.857 m

18. A stone is dropped from the peak of a hill. It covers a distance of 30 meters in the last second of its motion. Find the height of the peak. **(2013)**

62.132 m

19. A car is waiting at a traffic signal. As it turns green the car starts ahead with a constant acceleration of $3m/s^2$. At the same time, a bus traveling with a constant speed of 20 m/s overtakes and passes the car. (a)How far beyond its starting point will the car overtake the bus? (b)What will be the velocity of the car that time? **(2013)**

266.66 m , 39.99 m/s

20. A helicopter weight 3920 N.
(a)Calculate the force on it. If it is ascending vertically at a rate of 2 m/s^2.
(b) What will be the force on the helicopter if it is moving up vertically with the constant speed of 4 m/sec? **(2010)**

4720 N, 3920 N

Chap # 04 (MOTION IN TWO DIMENSIONS)

21. A boy standing 12m from a building can just barely reach the roof 10m above him when he throws a ball at the optimum angle with respect to the ground. Find the initially velocity components of the ball. **(2017)**

8.391 m/s, 14 m/s

22. Calculate the angle of projection for which the maximum height of a projectile is equal to 1/3 of its horizontal range, **(2018, 12)**

53.12^0

23. Tarzan swings on a vine, of length 5m, in a vertical circle, under the influence of gravity. When the vine makes an angle of 30° with the Vertical. Tarzan has a speed of 4m/s Find: (a) Centripetal acceleration at this instant b) His tangential acceleration. **(2016, 13)**

3.2 m/s^2 , 4.9 m/s^2

24. A boy whose mass is 100 kg when resting on the ground at the equator if the radius of earth 'R' is 6.4x10^6 m. Calculate the centripetal acceleration & centripetal force. **(2015, 14)**

3.385 X 10^{-2} m/s^2, 3.385 N

25. A particle of mass 500 gm rotates in a circular orbit of radius 25cm at a constant rate of 1.5 revolutions per second. Find the angular momentum with respect to center of the orbit. **(2014)**

0.2946 J-S

26. A mortar shell is fired at a ground level target of 400m distance with an initial velocity 85 m/ sec. Calculate the maximum time to hit the target. **(2014)**

16.64 Sec

27. A diver leaps from a lower with an initial horizontal velocity component of 7m/sec and upward velocity component of 5m/sec. Find the components of his velocity along x and y axis after 1.5 sec.

7 m/s , 9.7 m/s **(2012)**

Chap # 05 (TORQUE, ANGULAR MOMENTUM , EQUILIBRIUM)

28. A uniform ladder having length 'L' and weighing 50N, rests against a smooth vertical wall. If the co-efficient of friction between the ladder and the ground is 0.40, find the minimum angle such that the ladder may not slip. **(2019, 16, 11, 10)**

51.3^0

29. A particle of mass 0.5 kg moves along xy-plane. At that instant, the coordinates are (3,4)m and its velocity is (4+5) sec. Determine the angular momentum relative to origin at that time. **(2012)**

-o.5 $\hat{k}$ J.S

Chap # 06 (GRAVITATION)

30. How many times in a second does a spaceship, of diameter 30m, need to be rotated in order to create artificial gravity? **(2019, 12)**

0.1286 Rotation/Sec

31. What will be the effect on acceleration due to gravity and universal constant of gravitation if mass of the earth becomes 4 times and its radius remain the same? **(2018)**

4g

32. A man weighing 60 kg is standing on the floor of an elevator. Calculate the force exerted by the man when the elevator is ascending at the rate of 2 m/s^2. **(2018)**

708 N

33. The ratio of acceleration due to gravity inside a deep mine to that on the surface of the earth is 0.99. Find the depth of the mine, assuming that the density of the earth is uniform. Take the radius of the earth as 6.38x10^6 m. **(2017)**

6.38 X 10^4 m

34. The radius of the moon is 27% of the earth's radius and its mass is 1.2% of the earth's mass. Find the acceleration due to gravity on the surface of the moon. How much will a 424 N body weigh there?

1.613 m/s^2, 69.786 N **(2016, 14)**

35. At what distance from Centre of earth does gravitational acceleration have one third of the value that it has on the earth's surface? **(2015)**

Altitude $\sqrt{3}R_e$ ***, Depth*** $\frac{1}{3}R_e$

36. The mass of moon is approximately one eightieth (1/80) of the mass of earth and its radius is approximately one fourth (1/4) that of earth. Determine the acceleration due to gravity at the surface of the moon. **(2013)**

1.96 m/s^2

37. Calculate the centripetal acceleration and centripetal force on a man whose mass is 80 kg when resting on the ground at the equator. The radius of the earth is 6.4×10^6 m. **(2011)**

0.0338 m/s^2, 2.708 N

38. A simple pendulum completes 4 vibrations in 8 seconds on the surface of the earth. Find the time period on the surface of the moon where the acceleration due to gravity is one-sixth that of the earth. **(2010)**

4.8989 Sec

Chap # 07 (WORK , POWER & ENERGY)

39. A crane lifts a load of 6000 N through a vertical distance of 15 m in 30 sec. what is the potential energy at the highest point of this operation?

90,000J **(2018)**

40. A horse pulls a cart horizontally with a force of 60 lb at an angle of 30° above the horizontal and moves along at a speed of 8 miles per hour. How much work does the horse do in 15 minute and what is the power output of the (lhp=550fi-lb/s).(1 mile=5280ft). **(2017)**

1.23 X 10^{-3} hp

41. An object moves along a straight line in a force field from (3,2,-6) to (14,13,9) When a uniform force F = $4\hat{\imath} + \hat{\jmath} + 3\hat{k}$ acts on it. Find the work done. **(2016)**

100 J

42. A water pump is needed to lift water through a height of 2.5 m at the rate of 500 gm/minute. What will be the minimum horsepower of the pump? **(2016, 14, 11, 10)**

2.736 X 10^{-4} hp

43. An 80 kg man runs up a hill through a height of 3 m in 2 sec. What is his average power output?

1176 Watt **(2015)**

44. A horse pulls a cart horizontally with a force of 40N at an angle of 25° above the horizontal & moves along at a speed of 15 m/s. **(2013)**

1.631 X 10^5 Joules, 0.728 X 10^{-3} hp

45. An object weighing 98N is dropped from a height of 10m. It is found to be moving with a velocity 12 m/sec just before it hits the ground. How large was the frictional force acting upon it? **(2012)**

26 N

46. A ball of mass 100 gm is thrown up in air vertically and reaches a height of 9.8 m. calculate the velocity with which it is thrown up and its initial kinetic energy. Neglect air friction.

13.86 m/s , 9.6 J

Chap # 08 (SOUND)

47. A moving car has a siren sounding a 2 KHz tone. What frequency will be detected by a stationary observer as the car approaches him at 80 km/h (Speed of sound =1200km/h) **(2016)**

2.142 z

48. A car emitted a note of frequency 490 Hz, if the car approaching towards a stationary Listener at speed of 55 km/h what frequency will be detected by the listener. Take speed of sound as 334 m/s.

513.486 Hz **(2015)**

49. Find the velocity of sound in a gas when two waves of wavelengths 0.8m and 0.81m, respectively, produced 4 beats per seconds. **(2012)**

259.2 m/s

50. A note of frequency of 500 Hz is being emitted by an ambulance moving towards a listener at rest. If the listener detects a frequency of 526 Hz, calculate the speed of the ambulance.
(Speed of sound is 340 m/s) **(2011, 09)**

16.8 m/s

51. A note of frequency 650 Hz is emitted from an ambulance. What frequency will be detected by a listener if the ambulance moves (speed of sound is 340m/s)

(i) at a speed of 18m/s towards the listener

(ii) at a speed of 15m/s away from the listener? **(2008)**

686.3Hz, 617.3m/s

52. A car has its siren sounding 2 KHz tone. If the frequency heard by a stationary observer is 2143 Hz. find the speed at which it approaches the stationary observer. (speed of sound in air = 340m/s)

22.68m/s **(2007, 2005)**

53. Find the speed of sound in air at a temperature of 27℃. (Given that γ = 1.42, R = 8.313 J/mol K, Molecular mass of air = 28.8 x 10^{-3}kg/mole) **(2005)**

350 m/s

54. Two cars are moving straight towards each other from opposite direction with the same speed. The horn of one is blowing with a frequency of 3000Hz and is heard by the people in the other car with the frequency of 3400 Hz, find the speed of cars if the speed of sound in air is 340m/s. **(2003)**

21.25 m/s

55. A source of sound and a listener are moving towards each other with velocities which are 0.5 time and 0.2 times the speed of sound respectively. If the source is emitting 2 KHz tone, calculate the frequency heard by listener. **(2003)**

4800Hz

56. Calculate the speed of sound in air at S.T.P. What will be the speed of sound at 37℃?
(Given p = 1.2 kg/m^3 , γ = 1.42, 1 atm = 1.01 x 10^5N/m^2) **(2002)**

345.7 m/s ; 353.8 m/s

Chap # 08 (Waves)

57. A string 2m long and of mass 0.004kg, is stretched horizontally by passing one end over a pulley and attaching a 1 kg mass to it. Find the speed of the transverse waves on the string and the frequency of the second harmonic. **(2019, 16, 03)**

70 m/s, 35 Hz

58. a 100 cm long string vibrates in 4 loops at 50 Hz. The linear density of the string is $4x10^{-4}$ gram/cm. Calculate the tension in the string. **(2017)**

0.025 N

59. A string 2m long and of mass 0.004kg, is stretched horizontally by passing one end over a pulley and attaching a 1 kg mass to it. Find the speed of the transverse waves on the string and the frequency of the second and fourth harmonic to which the string will resonate. **(2014)**

70 m/s, 35 *Hz* , 70 m/s

60. A sound wave of frequency 500 Hz in air enters from a region of temperature 25°C to a region of temperature 5°C, Calculate percent fractional change in wavelength. **(2013)**

3.5 %

61. A string 1 m long and of mass 0.004 kg, is stretched with a force. Calculate the force if the speed of the wave in the string is 140m/sec. **(2012)**

78.4 N

62. If the tension in a string is doubled, what will be the effect on the speed of transverse waves in the string? **(2010)**

1.414V

63. A string 2m long and mass 0.004kg is stretched horizontally by passing one of its ends over a pulley and the string are attached with one kilogram mass to it vertically. Find the speed of transverse waves on the string and the frequency of the fundamental and fifth harmonic at which the string will vibrate. **(2010)**

70m/s, 17.5Hz, 87.5Hz

64. A sonometer wire of length of 1m, when plucked at the Centre, vibrates with a frequency of 250 Hz. Calculate the wavelength and the speed of the waves in the wire. **(2009, 2005)**

2m, 500m/s

65. A standing wave, in a string 2m long, has a frequency of 100 Hz and forms four loops; calculate the wavelength of the wave and the speed of waves. **(2007)**

1m, 100m/s

66. A standing wave is established in a 2.4m long string, fixed at both ends. The string vibrates in four segments when driven at 200 Hz. Determine (i) the wavelength (ii) the fundamental frequency.

1.2m, 50Hz **(2004)**

67. The frequency of a string is 125 Hz when it is vibrating in 5 segments (nodes at both ends). Calculate the frequency when the string vibrates in three and four segments. What is the speed of the wave in it if the length of the string is 0.80m? **(2001)**

75Hz, 100Hz, 40m/s

Chap # 08 (SHM)

68. A mass at the end of spring oscillates with a period of 0.4sec. Find the acceleration when the displacement is 6cm. **(2019, 14, 10)**

14.817 m/s^2

69. A body hanging from a spring is set into motion and the period of oscillation is found to be 0.5 sec. After the body has Come to rest, it is removed. How much shorter will the spring be when it comes to rest. **(2015)**

6.2 cm

70. A body hanging from a spring is set into motion. The period of oscillation is found to be 0.4s. After the body comes to rest, it is removed. How much shorter will the spring be when it is separated from the body. **(2013)**

3.97 cm

71. A simple pendulum completes 4 vibrations in 8s on the surface of the earth. Find the time period on the surface of the moon where the acceleration due to gravity is one-sixth that of the earth.

4.898 **(2010)**

72. The time period of a simple pendulum is 2s on the surface of the earth. Calculate its time period on the surface of the moon where the value of acceleration due to gravity is one-sixth that of its value on the earth's surface. **(2009, 2007)**

4.89 Sec

73. A body, of mass 32gm, attached to an elastic spring, is performing SHM. Its velocity is 0.4 m/s when the displacement is 8cm towards right. If the spring constant is 0.4 N/m. calculate,
(i) the total energy (ii) the amplitude of its motion **(2008)**

0.00384 J, 0.138m

74. Calculate the length of the second pendulum at a place where g = 10 m/s^2 **(2007)**

1.01m

75. Find the length of the second pendulum on the planet Jupiter where the value of 'g' is 2.63 times that of 'g' on the surface of the earth. **(2005)**

2.61 m

76. A body of mass 25gm, attached to a spring, is vibrating on a smooth horizontal surface when it is displaced 10cm to the right of its mean position, the period of vibration is 1.57s and the velocity at the end of this displacement is 0.4m/s, determine
(a) The spring constant (b) the total energy (c) the amplitude of motion. **(2004)**

0.4 N/m, 0.004 J , 0.141m

77. A mass, at the end of a spring, oscillates with simple harmonic motion with a period of 0.4 sec; find the acceleration when the displacement is 4.0cm. (**2003)**

9.86 m/s

78. A body is hanging from a spring into motion and the period of oscillation is found to be 0.8s. After the body has come to rest, it is removed. How much shorter will the spring be when it comes to rest.

0.159m

79. Compute the acceleration due to gravity on the surface of moon where a simple pendulum 1.5m long completes 100 vibrations in 605 seconds. **(2002)**

1.616 m/s^2

80. A 15 kg block is suspended by a spring of spring constant 5x10^3 N/m. Calculate the frequency of vibration of the block displaced from its equilibrium position and then released. **(2018)**

2.89 Hz

81. A standing wave is established in a 135 cm long string fixed at both ends. The string vibrates in four loops when driven at 130 Hz. Determine the fundamental frequency. **(2018)**

32.5 Hz

82. A string 2 m long, of mass 0.004 kg, is stretched horizontally by passing one end over a frictionless pulley and a mass of 1 kg is suspended. Find the speed of transverse waves on the string. **(2016)**

70 m/s

83. A string 1 m long and of mass 0.004 kg, is stretched with a force. Calculate the force if the speed of the wave in the string is 140m/sec. **(2012)**

78.4 N

Chap # 09 (NATURE OF LIGHT)

84. 271 Fringes are passed through a reference point when a moveable mirror of Michelson's interferometer is moved by 0.08 mm. Find the wavelength of light used in A^0 ? **(2019)**

5904 A^0

85. A diffraction grating produces 3rd order spectrum of light of wavelength 7000A^0 at an angle of 30° from the normal. What is the grating element? Calculate the number of lines of grating per cm.**(2019)**

4.2 x 10^{-6} m , 2380 lines/cm

86. If the radius of the 5th dark Newton's ring is 3mm when light of wavelength 5.89x10^{-7} m is used, what will be the radius of curvature of the lower surface of the lens used. **(2017)**

3.05 m

87. A diffraction grating produces 3rd order spectrum of light of wavelength 7x10^{-7} m at an angle of 30° from the normal. What is its grating element? Calculate the number of lines per mm. **(2017)**

4.2 x 10^{-6} m , 238 lines/mm)

88. In a double slit experiment, the separation of the slit is 1.9 mm and the fringe spacing is 0.31mm, at a distance of 1 m from the slits. Find the wavelength of light. **(2016)**

5890 A^0

89. A parallel beam of X-rays is diffracted by rock salt crystal. The 1st order maximum being obtained when the glancing angle of incidence is 6 degree and 5 minutes, the distance between the atomic planes of crystal is 2.81 x 10^{-10} m. Calculate the wavelength of radiation. **(2015)**

5.95 x 10^{-11} m

90. Green light wavelength 5400 A^0 is diffracted by grating having 2000 lines/cm. Compute the angular deviation of the third order image. **(2014, 10)**

18.9 ^{0}

91. In double slit experiment, eight fringes occupy 2.62mm on a screen 145 mm away from the slits. The wavelength of light is 545nm. Find the slit separation. **(2012)**

0.241 mm

92. If the diffraction grating produces first order spectrum of light of wavelength 6 x 10^{-7} m at an angle of 20° from the normal, calculate the number of lines per mm. **(2011)**

570 lines/mm

93. If the radius of the 14th bright Newton's ring is 1 mm and the radius of curvature of the lens is 125 mm, calculate the wavelength of the light. **(2010)**

5925 A^0

94. If a diffraction grating produces first order spectrum of light of wavelength 6 x 10^{-7} m at an angle of 20^0 from the normal, calculate the number of lines per millimeter **(2011, 2007)**

570 lines/mm

95. If the radius of 14th bright Newton's ring is 1 mm and the radius of curvature of the lens is 125mm, calculate the wavelength of light. **(2010)**

5.92 x 10^{-7}m

96. A parallel beam of X-ray is diffracted by a crystal. The first order maximum is obtained when the glancing angle is 6.5^0. If the distance between the atomic planes is 2.81 A^0 , calculate the wavelength of radiation. **(2009)**

6.36 x 10^{-11} m

97. Interference fringes were produced by two slits 0.25mm apart on a screen 150mm from the Slits. If ten fringes occupy 3.275mm, what is the wavelength of the light producing fringes? **(2008)**

5.458 x 10^{-7}m

98. A diffraction grating produces third order spectrum of light of wavelength 7 x 10^{-7}m at an angle of 30° from the normal. What is the grating element? Calculate the number of lines per millimeter.

4.2 x 10^{-6}m, 238 lines/mm) **(2017)**

99. A diffraction grating produces first order spectrum of light of wavelength 5400 A^0 at an angle of 18^0 from the normal. Calculate the number of lines per millimeter. **(2017 failure)**

572 lines/mm

100. A green light of wavelength 5400 A^0 is diffracted by a grating having 2000 lines per cm. find the angular deviation of 3^{rd} order maximum. **(2005)**

18.9^0

101. X-rays of wavelength 2.54 A^0 are diffracted by a crystal whose planes are 2.81 A^0apart. Find the glancing angle of the first order. **(2004)**

26.87^0

102. The diameter of the 14th bright Newton's ring is 0.005m when the light of wavelength 5893 A^0 is used. What is the radius of curvature of the Plano-convex lens? Also calculate the thickness of the air film corresponding to this ring. **(2003)**

0.786m, 3.975 x 10^{-6}m

103. If the radius of 12th dark Newton's ring is 1mm when the light of wavelength 5890 A^0 is used. what is the radius of curvature of the lower surface of the lens used?

0.141m

104. When light of wavelength 6000 A^0 falls on a grating, it produces second order spectrum at an angle of 30° from the normal, find (i) the grating element (ii) the number of lines per millimeter ruled on it.

2.4 x 10^{-6}m, 417 lines /mm **(2003)**

105. In a double slit experiment, the separation of slits is 1.8mm and the fringe spacing is 0.3mm at a distance of 1200mm from the slits, find the wavelength of light. **(2002)**

4.5 x 10^{-7}m

106. 271 fringes pass a reference point when the movable mirror of Michelson's interferometer is moved by 0.08mm. Find the wavelength of the light used in angstrom. **(2002)**

5.9 x 10^{-7}m

107. How much should the movable mirror of the Michelson's interferometer be moved in order to observe 400 fringes with reference to a point? The wavelength of the light used is 5890 A^0. **(2002)**

0.1178mm

108. Determine the wavelength of a monochromatic light used if 14th bright Newton's ring has a radius of 1mm when a Plano-convex lens of radius of curvature 126mm is used. **(2001)**

5.87 x 10^{-7}m

109. Interference fringes were produced by light coming from two slits 0.3mm apart. If five fringes occupy 1.75mm on a screen at 200mm from the slits, find the wavelength of light. **(2000)**

5.25 x 10^{-7}m

Chap # 10 (GEOMETRICAL OPTICS)

110. An astronomical telescope having angular magnifications 5 consists of two thin lenses 24cm apart. Find the power of its lenses. **(2019)**

5 dioptres

111. An Astronomical Telescope has a length of 105 cm and its magnification is 6. Determine the power of objective and eyepiece. **(2018, 12)**

6.66 dioptre , 1.11 dioptre

112. A microscope has an objective of 12 mm focal length and eyepiece of 25 mm focal length. What is the distance between the lenses? What is the magnifying power if the object is in sharp focus when it is 15 mm form the objective? (-q = 250 mm) **(2018)**

82.7 mm, 44

113. A lens 2cm focal length is to be used a magnifying glass. How far from the lens should the object be placed? What is its magnifying power? **(2017)**

1.85 cm, 13.5

114. A converging lens of 4 diopters is placed in contact with a diverging lens of -2 diopters. Find the power and the focal length of combination. **(2016)**

2 diopter, 50 cm

115. A watch maker uses a magnifying glass of focal length 5cm to see the damaged spring of a watch. If he holds the glass close to the eye what is the best position of the object? What is the linear magnification. **(2014, 17)**

4.17 cm , 6

116. A magnifying glass of focal length 6 cm is used to see a small specimen. The least distance of distinct vision of the observer is 25 cm. What is the magnifying power of the lens? **(2013)**

5.167

117. Two converging lenses of focal lengths 30 cm and 60 cm are placed in contact. What is the focal length of this combination? Calculate the power of the combination in diopters. **(2011)**

20 cm , 5 dioptres

118. A magnifying glass produces an image of magnifying 6. What is the power of the lens? What is the best position of the object if a watch maker holds the same lens close to his eye to see the damaged spring of the watch? **(2010, 2001)**

20 dioptres , 4.166 cm

119. What is the magnification of an astronomical telescope focused for infinity, when the powers of its objective and eyepiece are 2 diopters and 20 dioptres respectively? **(2009)**

10

120. A compound microscope has an objective with focal length of 10mm and a tube 232mm long. The final image is produced 250mm from the eyepiece when the object is 10.5mm from the objective. What is the angular magnification? **(2008)**

227

121. If the magnification of a telescope is 11 and its length is 120cm, determine the focal length of its objective and eyepiece when the telescope is focussed for infinity. **(2007)**

110 cm, 10 cm

122. A compound microscope has an objective with focal length of 10mm and tube 100mm long. An image is produced 250mm from the eyepiece when the object is 12mm from the objective. What is the angular magnification? **(2006)**

31

123. A telescope has the objective and the eyepiece lenses of powers 2 and 10 dioptres respectively. What are the magnifying power and the length of telescope if it is focused for infinity? **(2005,2003, 2002)**

5 , 60cm

124. A compound microscope has an objective and an eyepiece of focal lengths 1 cm and 5 cm respectively. The object is located 1.05cm from the objective which forms an image 4.17cm close to the eyepiece. the final image is formed at 25cm from the eyepiece. Calculate the magnifying power of microscope. Also calculate the length of the tube. **(2003)**

120, 25.17cm