Assignment

Human eye

1. Near and far points of human eye are **[EAMCET (Med.) 1995; MP PET 2001; Bihar CECE 2004]**

(a) 25 *cm* and infinite (b) 50 *cm* and 100 *cm* (c) 25 *cm* and 50 *cm* (d) 0 *cm* and 25 *cm*

2. A defective eye cannot see close objects clearly because their image is formed **[MP PET 2003]**

(a) On the eye lens (b) Between eye lens and retina

(c) On the retina (d) Beyond retina

3. Retina of eye acts like ..... of camera **[AFMC 2003]**

(a) Shutter (b) Film (c) Lens (d) None of these

4. A person who can see things most clearly at a distance of 10 *cm*. Requires spectacles to enable him to see clearly things at a distance of 30 *cm*. What should be the focal length of the spectacles **[BHU 2003]**

(a) 15 *cm* (concave) (b) 15 *cm* (convex) (c) 10 *cm* (d) 0

5. An astronaut is looking down on earth's surface from a space shuttle at an altitude of $400\,km$. Assuming that the astronaut's pupil diameter is $5\,mm$ and the wavelength of visible light is $500\,nm$. The astronaut will be able to resolve linear object of the size of about **[AIIMS 2003]**

(a) 0.5 *m* (b) $5\,m$ (c) 50 *m* (d) 500 *m*

6. A person uses a lens of power + 3*D* to normalise vision. Near point of hypermetropic eye is **[CPMT 2002]**

(a) 1 *m* (b) 1.66 *m* (c) 2 *m* (d) 0.66 *m*

7. The separation between two microscopic particles is measured P_A and P_B by two different lights of wavelength 2000 $\mathring{A}$ and 3000 $\mathring{A}$ respectively, then **[AIEEE 2002]**

(a) $P_A > P_B$ (b) $P_A < P_B$ (c) $P_A < 3/2P_B$ (d) $P_A = P_B$

8. To remove myopia (short sightedness) a lens of power 0.66 *D* is required. The distant point of the eye is approximately **[MP PMT 2001]**

(a) 100 *cm* (b) 150 *cm* (c) 50 *cm* (d) 25 *cm*

9. A person suffering from 'presbyopia' should use **[MP PET 2001]**

(a) A concave lens (b) A convex lens

(c) A bifocal lens whose lower portion is convex (d) A bifocal lens whose upper portion is convex

10. The resolving limit of healthy eye is about **[MP PET 1999; RPMT 1999; AIIMS 2001]**

(a) 1′ (b) 1″ (c) 1° (d) $\frac{1}{60}$ ″

11. A person uses spectacles of power + 2*D*. He is suffering from **[MP PET 2000]**

(a) Short sightedness or myopia (b) Long sightedness or hypermetropia

(c) Presbyopia (d) Astigmatism

12. The hyper metropia is a **[CBSE PMT 2000]**

(a) Short-side defect (b) Long-side defect

(c) Bad vision due to old age (d) None of these

13. A man cannot see clearly the objects beyond a distance of 20 *cm* from his eyes. To see distant objects clearly he must use which kind of lenses and of what focal length **[MP PMT 2000]**

(a) 100 *cm* convex (b) 100 *cm* concave (c) 20 *cm* convex (d) 20 *cm* concave

14. An eye specialist prescribes spectacles having a combination of convex lens of focal length 40 *cm* in contact with a concave lens of focal length 25 *cm*. The power of this lens combination in diopters is **[IIT 1997 Cancelled; DPMT 2**

(a) + 1.5 (b) –1.5 (c) +6.67 (d) –6.67

15. Two parallel pillars are 11 *km* away from an observer. The minimum distance between the pillars so that they can be seen separately will be **[RPET 1997; RPMT 2000]**

(a) 3.2 *m* (b) 20.8 *m* (c) 91.5 *m* (d) 183 *m*

16. A person cannot see objects clearly beyond 2.0 *m*. The power of lens required to correct his vision will be **[MP PMT/PET 1998; JIPMER 2000; KCET (Engg./Med.) 2000]**

(a) + 2.0 *D* (b) – 1.0 *D* (c) + 1.0 *D* (d) – 0.5 *D*

17. When objects at different distances are seen by the eye, which of the following remains constant **[MP PMT 1999]**

(a) The focal length of the eye lens (b) The object distance from the eye lens

(c) The radii of curvature of the eye lens (d) The image distance from the eye lens

18. A person wears glasses of power –2.0 *D*. The defect of the eye and the far point of the person without the glasses will be **[MP PMT 1999]**

(a) Nearsighted, 50 *cm* (b) Farsighted, 50 *cm* (c) Nearsighted, 250 *cm* (d) Astigmatism, 50 *cm*

19. A person is suffering from the defect astigmatism. Its main reason is **[MP PMT 1997]**

(a) Distance of the eye lens from retina is increased (b) Distance of the eye lens from retina is decreased

(c) The cornea is not spherical (d) Power of accommodation of the eye is decreased

20. Myopia is due to **[AFMC 1996]**

(a) Elongation of eye ball (b) Irregular change in focal length

(c) Shortening of eye ball (d) Older age

21. Human eye is most sensitive to visible light of the wavelength **[CPMT 1996]**

(a) 6050 *Å* (b) 5500 *Å* (c) 4500 *Å* (d) 7500 *Å*

22. Match the List I with the List II from the combinations shown **[ISM Dhanbad 1994]**

(I) Presbiopia (A) Sphero-cylindrical lens

(II) Hypermetropia (B) Convex lens of proper power may be used close to the eye

(III) Astigmatism (C) Concave lens of suitable focal length

(IV) Myopia (D) Convex spectacle lens of suitable focal length

(a) I-A; II-C; III-B; IV-D (b) I-B; II-D; III-C; IV-A (c) I-D; II-B; III-A; IV-C (d) I-D; II-A; III-C; IV-B

23. The human eye has a lens which has a **[MP PET 1994]**

(a) Soft portion at its centre (b) Hard surface

(c) Varying refractive index (d) Constant refractive index

24. A man with defective eyes cannot see distinctly object at the distance more than 60 *cm* from his eyes. The power of the lens to be used will be **[MP PMT 1994]**

(a) + 60*D* (b) – 60*D* (c) – 1.66*D* (d) $\frac{1}{1.66}D$

25. A person's near point is 50 *cm* and his far point is 3 *m*. Power of the lenses he requires for

(i) Reading and (ii) For seeing distant stars are **[MP PMT 1994]**

(a) – 2*D* and 0.33*D* (b) 2*D* and – 0.33*D* (c) – 2*D* and 3*D* (d) 2*D* and – 3*D*

26. The focal length of a simple convex lens used as a magnifier is 10 *cm*. For the image to be formed at a distance of distinct vision (D = 25 *cm*), the object must be placed away from the lens at a distance of **[CPMT 1991]**

(a) 5 *cm* (b) 7.14 *cm* (c) 7.20 *cm* (d) 16.16 *cm*

27. A person is suffering from myopic defect. He is able to see clear objects placed at 15 *cm*. What type and of what focal length of lens he should use to see clearly the object placed 60 *cm* away **[MP PMT 1991]**

(a) Concave lens of 20 *cm* focal length (b) Convex lens of 20 *cm* focal length

(c) Concave lens of 12 *cm* focal length (d) Convex lens of 12 *cm* focal length

28. A person can see a thing clearly when it is at a distance of 1 *metre* only. If he wishes to see a distance star, he needs a lens of focal length **[MP PET 1990]**

(a) +100 *cm* (b) – 100 *cm* (c) +50 *cm* (d) –50 *cm*

29. A man suffering from myopia can read a book placed at 10 *cm* distance. For reading the book at a distance of 60 *cm* with relaxed vision, focal length of the lens required will be **[MP PMT 1989]**

(a) 45 *cm* (b) – 20 *cm* (c) –12 *cm* (d) 30 *cm*

30. A person can see clearly objects at 100 *cm* distance. If he wants to see objects at 40 *cm* distance, then the power of the lens he shall require is **[MP PET 1989]**

(a) +1.5 *D* (b) – 1.5 *D* (c) +3.0 *D* (d) –3.0 *D*

31. If the distance of the far point for a myopia patient is doubled, the focal length of the lens required to cure it will become **[MP PET 1989]**

(a) Half (b) Double

(c) The same but a convex lens (d) The same but a concave lens

32. Image is formed for the short sighted person at **[AFMC 1988]**

(a) Retina (b) Before retina (c) Behind the retina (d) Image is not formed at all

33. A man who cannot see clearly beyond 5 *m* wants to see stars clearly. He should use a lens of focal length **[MP PET/PMT 1988]**

(a) – 100 *metre* (b) + 5 *metre* (c) – 5 *metre* (d) Very large

34. Far point of myopic eye is 250 *cm*, then the focal length of the lens to be used will be **[CPMT 1986; DPMT 2002]**

(a) + 250 *cm* (b) – 250 *cm* (c) + 250/9 *cm* (d) – 250/9 *cm*

35. One can take pictures of objects which are completely invisible to the eye using camera film which are invisible to **[MNR 1985]**

(a) Ultra-violet rays (b) Sodium light (c) Visible light (d) Infra-red rays

36. In human eye the focussing is done by **[CPMT 1983]**

(a) To and fro movement of eye lens (b) To and fro movement of the retina

(c) Change in the convexity of the lens surface (d) Change in the refractive index of the eye fluids

37. The minimum light intensity that can be perceived by the eye is about 10^{-10} *watt* / *metre*^{2} . The number of photons of wavelength 5.6×10^{-7} *metre* that must enter per second the pupil of area 10^{-4} *metre*^{2} for vision, is approximately equal to $(h = 6.6\times10^{-34}$ *joule* $-$ sec$)$ **[NCERT 1982]**

(a) 3×10^{2} *photons* (b) 3×10^{6} *photons* (c) 3×10^{4} *photons* (d) 3×10^{5} *photons*

38. A far sighted man who has lost his spectacles, reads a book by looking through a small hole (3-4 *mm*) in a sheet of paper. The reason will be **[CPMT 1977]**

(a) Because the hole produces an image of the letters at a longer distance

(b) Because in doing so, the focal length of the eye lens is effectively increased

(c) Because in doing so, the focal length of the eye lens is effectively decreased

(d) None of these

39. The maximum focal length of the eye-lens of a person is greater than its distance from the retina. The eye is

(a) Always strained in looking at an object (b) Strained for objects at large distances only

(c) Strained for objects at short distances only (d) Unstrained for all distances

40. The focal length of a normal eye-lens is about

(a) 1 *mm* (b) 2 *cm* (c) 25 *cm* (d) 1

41. The distance of the eye-lens from the retina is *x*. For normal eye, the maximum focal length of the eye-lens is

(a) = *x* (b) < *x* (c) > *x* (d) = 2*x*

42. A man wearing glasses of focal length +1*m* can clearly see beyond 1*m*

(a) If he is farsighted (b) If he is nearsighted (c) If his vision is normal (d) In each of these cases

43. The near point of a person is 50 *cm* and the far point is 1.5 *m*. The spectacles required for reading purpose and for seeing distance are respectively

(a) $+2D, -\left(\frac{2}{3}\right)D$ (b) $+\left(\frac{2}{3}\right)D - 2D$ (c) $-2D, +\left(\frac{2}{3}\right)D$ (d) $-\left(\frac{2}{3}\right)D + 2D$

44. A man, wearing glasses of power +2*D* can read clearly a book placed at a distance of 40 *cm* from the eye. The power of the lens required so that he can read at 25 *cm* from the eye is

(a) +4.5 *D* (b) +4.0 *D* (c) +3.5 *D* (d) +3.0 *D*

45. A person can see clearly between 1 *m* and 2*m*. His corrective lenses should be

(a) Bifocals with power –0.5*D* and additional +3.5*D* (b) Bifocals with power –1.0*D* and additional +3.0 *D*

(c) Concave with power 1.0 *D* (d) Convex with power 0.5 *D*

46. While reading the book a man keeps the page at a distance of 2.5 *cm* from his eye. He wants to read the book by holding the page at 25 *cm*. What is the nature of spectacles one should advice him to use to completely cure his eye sight

(a) Convex lens of focal length 25 *cm* (b) Concave lens of focal length 25 *cm*

(c) Convex lens of focal length 2.5 *cm* (d) Concave lens of focal length 2.5 *cm*

47. The blades of a rotating fan can not be distinguished from each other due to

(a) Parallex (b) Power of accommodation (c) Persistence of vision (d) Binocular vision

48. Aperture of the human eye is 2 *mm*. Assuming the mean wavelength of light to be 5000 *Å*, the angular resolution limit of the eye is nearly

(a) 2 *minutes* (b) 1 *minute* (c) 0.5 *minute* (d) 1.5 *minutes*

49. If there had been one eye of the man, then

(a) Image of the object would have been inverted (b) Visible region would have decreased

(c) Image would have not been seen three dimensional (d) (b) and (c) both

50. A man can see the object between 15*cm* and 30*cm*. He uses the lens to see the far objects. Then due to the lens used, the near point will be at

(a) $\frac{10}{3}$ *cm* (b) 30 *cm* (c) 15 *cm* (d) $\frac{100}{3}$ *cm*

51. A presbyopic patient has near point as 30 *cm* and far point as 40 *cm*. The dioptric power for the corrective lens for seeing distant objects is

(a) 40 *D* (b) 4 *D* (c) 2.5 *D* (d) 0.25 *D*

52. A man swimming under clear water is unable to see clearly because

(a) The size of the aperture decreases (b) The size of the aperture increases

(c) The focal length of eye lens increases (d) The focal length of eye lens decreases

53. The distance between retina and eye-lens in a normal eye is 2.0 *cm*. The accommodated power of eye lens range from

(a) 45 *D* to 50 *D* (b) 50 *D* to 54 *D* (c) 10 *D* to 16 *D* (d) 5 *D* to 8 *D*

54. If the eye is taken as a spherical ball of radius 1 *cm*, the range of accommodated focal length of eye-lens is

(a) 1.85 *cm* to 2.0 *cm* (b) 1.0 *cm* to 2.8 *cm* (c) 1.56 *cm* to 2.5 *cm* (d) 1.6 *cm* to 2.0 *cm*

55. A person cannot read printed matter within 100 *cm* from his eye. The power of the correcting lens required to read at 20 *cm* from his eye if the distance between the eye lens and the correcting lens is 2 *cm* is

(a) 4.8 *D* (b) 1.25 *D* (c) 4.25 *D* (d) 4.55 *D*

56. A student having –1.5 *D* spectacles uses a lens of focal length 5 *cm* as a simple microscope to read minute scale divisions in the laboratory. The least distance of distinct vision without glasses is 20 *cm* for the student. The maximum magnifying power he gets with spectacles on is

(a) 6 (b) 9 (c) 5 (d) 4

Microscope

57. In a compound microscope the object of f_o and eyepiece of f_e are placed at distance L such that L equals **[Kerala PMT 200**

(a) $f_o + f_e$ (b) $f_o - f_e$

(c) Much greater than f_o or f_e (d) Need not depend either value of focal lengths

58. In a simple microscope, if the final image is located at infinity then its magnifying power is **[CPMT 1985; MP PMT 2004]**

(a) $\frac{25}{f}$ (b) $\frac{D}{25}$ (c) $\frac{f}{25}$ (d) $\frac{f}{D^{+1}}$

59. In a simple microscope, if the final image is located at 25 *cm* from the eye placed close to the lens, then the magnifying power is

[BVP 2003]

(a) $\frac{25}{f}$ (b) $1+\frac{25}{f}$ (c) $\frac{f}{25}$ (d) $\frac{f}{25}+1$

60. The maximum magnification that can be obtained with a convex lens of focal length 2.5 *cm* is (the least distance of distinct vision is 25 *cm*) **[MP PET 2003]**

(a) 10 (b) 0.1 (c) 62.5 (d) 11

61. In a compound microscope, the intermediate image is **[IIT-JEE (Screening) 2000; AIEEE 2003]**

(a) Virtual, erect and magnified (b) Real, erect and magnified

(c) Real, inverted and magnified (d) Virtual, erect and reduced

62. A compound microscope has two lenses. The magnifying power of one is 5 and the combined magnifying power is 100. The magnifying power of the other lens is **[Kerala PMT 2002]**

(a) 10 (b) 20 (c) 50 (d) 25

63. Wavelength of light used in an optical instrument are $\lambda_1 = 4000\ \AA$ and $\lambda_2 = 5000\ \AA$, then ratio of their respective resolving power (corresponding to λ_1 and λ_2) is **[AIEEE 2002]**

(a) 16 : 25 (b) 9 : 1 (c) 4 : 5 (d) 5 : 4

64. The angular magnification of a simple microscope can be increased by increasing **[Orissa JEE 2002]**

(a) Focal length of lens (b) Size of object (c) Aperture of lens (d) Power of lens

65. The magnification produced by the objective lens and the eye lens of a compound microscope are 25 and 6 respectively. The magnifying power of this microscope is **[Manipal MEE 1995; DPMT 2002]**

(a) 19 (b) 31 (c) 150 (d) $\sqrt{150}$

66. The length of the compound microscope is 14 *cm*. The magnifying power for relaxed eye is 25. If the focal length of eye lens is 5 *cm*, then the object distance for objective lens will be **[Pb. PMT 2002]**

(a) 1.8 *cm* (b) 1.5 *cm* (c) 2.1 *cm* (d) 2.4 *cm*

67. The magnifying power of a simple microscope is 6. The focal length of its lens in *metres* will be, if least distance of distinct vision is 25 *cm* **[MP PMT 2001]**

(a) 0.05 (b) 0.06 (c) 0.25 (d) 0.12

68. Relative difference of focal lengths of objective and eye lens in the microscope and telescope is given as **[MH CET (Med.) 2001]**

(a) It is equal in both (b) It is more in telescope (c) It is more in microscope (d)It may be more in any one

69. Three objective focal lengths (f_o) and two eye piece focal lengths (f_e) are available for a compound microscope. By combining these two, the magnification of microscope will be maximum when **[RPMT 2001]**

(a) $f_o = f_e$ (b) $f_o >> f_e$ (c) f_o and f_e both are small (d) $f_o >> f_e$

70. If the red light is replaced by blue light illuminating the object in a microscope the resolving power of the microscope **[DCE 2001]**

(a) Decreases (b) Increases (c) Gets halved (d) Remains unchanged

71. In case of a simple microscope, the object is placed at **[UPSEAT 2000]**

(a) Focus *f* of the convex lens (b) A position between *f* and 2*f* (c) Beyond 2*f* (d)

72. In a compound microscope cross-wires are fixed at the point **[EAMCET (Engg.) 2000]**

(a) Where the image is formed by the objective (b) Where the image is formed by the eye-piece

(c) Where the focal point of the objective lies (d) Where the focal point of the eye-piece lies

73. The length of the tube of a microscope is 10 *cm*. The focal lengths of the objective and eye lenses are 0.5 *cm* and 1.0 *cm*. The magnifying power of the microscope is about **[MP PMT 2000]**

(a) 5 (b) 23 (c) 166 (d) 500

74. Least distance of distinct vision is 25 *cm*. Magnifying power of simple microscope of focal length 5 *cm* is **[EAMCET (Engg.) 1995; Pb. PMT 1999]**

(a) 1/5 (b) 5 (c) 1/6 (d) 6

75. The objective of a compound microscope is essentially **[SCRA 1998]**

(a) A concave lens of small focal length and small aperture (b) Convex lens of small focal length and large aperture

(c) Convex lens of large focal length and large aperture (d) Convex lens of small focal length and small aperture

76. For relaxed eye, the magnifying power of a microscope is **[CBSE PMT 1998]**

(a) $-\frac{v_o}{u_o}\times\frac{D}{f_e}$ (b) $-\frac{v_o}{u_o}\times\frac{f_e}{D}$ (c) $\frac{u_o}{v_o}\times\frac{D}{f_e}$ (d) $\frac{u_o}{v_o}\times\left(-\frac{D}{f_e}\right)$

77. A person using a lens as a simple microscope sees an **[AIIMS 1998]**

(a) Inverted virtual image (b) Inverted real magnified image

(c) Upright virtual image (d) Upright real magnified image

78. The focal length of the objective lens of a compound microscope is **[CPMT 1985; MNR 1986; MP PET 1997]**

(a) Equal to the focal length of its eye piece (b) Less than the focal length of eye piece

(c) Greater than the focal length of eye piece (d) Any of the above three

79. To produce magnified erect image of a far object, we will be required along with a convex lens, is **[MNR 1983; MP PAT 1996]**

(a) Another convex lens (b) Concave lens (c) A plane mirror (d) A concave mirror

80. An object placed 10 *cm* in front of a lens has an image 20 *cm* behind the lens. What is the power of the lens (in *dioptres*) **[MP PMT 1995]**

(a) 1.5 (b) 3.0 (c) – 15.0 (d) +15.0

81. Resolving power of a microscope depends upon **[MP PET 1995]**

(a) The focal length and aperture of the eye lens (b) The focal lengths of the objective and the eye lens

(c) The apertures of the objective and the eye lens (d) The wavelength of light illuminating the object

82. If the focal length of the objective lens is increased then **[MP PMT 1994]**

(a) Magnifying power of microscope will increase but that of telescope will decrease

(b) Magnifying power of microscope and telescope both will increase

(c) Magnifying power of microscope and telescope both will decrease

(d) Magnifying power of microscope will decrease but that of telescope will increase

83. If in compound microscope m_1 and m_2 be the linear magnification of the objective lens and eye lens respectively, then magnifying power of the compound microscope will be **[CPMT 1985; KCET 1994]**

(a) $m_1 - m_2$ (b) $\sqrt{m_1 + m_2}$ (c) $(m_1 + m_2)/2$ (d) $m_1 \times m_2$

84. The magnifying power of a microscope with an objective of 5 *mm* focal length is 400. The length of its tube is 20 *cm*. Then the focal length of the eye-piece is **[MP PMT 1991]**

(a) 200 *cm* (b) 160 *cm* (c) 2.5 *cm* (d) 0.1 *cm*

85. In a compound microscope, if the objective produces an image I_o and the eye piece produces an image I_e, then

[MP PET 1990]

(a) I_o is virtual but I_e is real (b) I_o is real but I_e is virtual (c) I_o and I_e are both real(d)

86. In an electron microscope if the potential is increased from 20 *kV* to 80 *kV*, the resolving power of the microscope will change from *R* to **[CPMT 1988, 89]**

(a) $R/4$ (b) $4R$ (c) $2R$ (d) $R/2$

87. When the length of a microscope tube increases, its magnifying power **[MNR 1986]**

(a) Decreases (b) Increases (c) Does not change (d) May decrease or increase

88. An electron microscope is superior to an optical microscope in **[CPMT 1984]**

(a) Having better resolving power (b) Being easy to handle

(c) Low cost (d) Quickness of observation

89. In a compound microscope magnification will be large, if the focal length of the eye piece is **[CPMT 1984]**

(a) Large (b) Smaller (c) Equal to that of objective (d)Less than that of objective

90. An electron microscope gives better resolution than optical microscope because **[CPMT 1982]**

(a) Electrons are abundant (b) Electrons can be focused nicely

(c) Effective wavelength of electron is small (d) None of these

91. A man is looking at a small object placed at his near point. Without altering the position of his eye or the object, he puts a simple microscope of magnifying power 5*X* before his eyes. The angular magnification achieved is

(a) 5 (b) 2.5 (c) 1 (d) 0.2

92. The focal length of the objective of a compound microscope is f_0 and its distance from the eyepiece is *L*. The object is placed at a distance *u* from the objective. For proper working of the instrument

(a) $L < u$ (b) $L > u$ (c) $f_0 < L < 2f_0$ (d) $L > 2f_0$

93. Find the maximum magnifying power of a compound microscope having a 25 *diopter* lens as the objective, a 5 *diopter* lens as the eyepiece and the separation 30 *cm* between the two lenses. The least distance for clear vision is 25 *cm*

(a) 8.4 (b) 7.4 (c) 9.4 (d) 10.4

94. The focal length of the objective and the eye-piece of a microscope are 2 *cm* and 5 *cm* respectively and the distance between them is 30 *cm*. If the image seen by the eye is 25 *cm* from the eye-piece, the distance of the object from the objective is

(a) 0.8 *cm* (b) 2.3 *cm* (c) 0.4 *cm* (d) 1.2 *cm*

95. The focal length of objective and eye-piece of a microscope are 1 *cm* and 5 *cm* respectively. If the magnifying power for relaxed eye is 45, then length of the tube is

(a) 6 *cm* (b) 9 *cm* (c) 12 *cm* (d) 15 *cm*

96. A microscope has an objective of focal length 1.5 *cm* and an eye-piece of focal length 2.5 *cm*. If the distance between objective and eye-piece is 25 *cm*. What is the approximate value of magnification produced for relaxed eye is

(a) 75 (b) 110 (c) 140 (d) 25

97. The magnifying power of a microscope is generally marked as 10*X*, 100 *X*, etc. These markings are for a normal relaxed eye. A microscope marked 10*X* is used by an old man having his near point at 40 *cm*. The magnifying power of the microscope for the old man with his eyes completely relaxed is

(a) 10 (b) 18 (c) 12 (d) 16

98. If the focal length of objective and eye lens are 1.2 *cm* and 3 *cm* respectively and the object is put 1.25 *cm* away from the objective lens and the final image is formed at infinity. The magnifying power of the microscope is

(a) 150 (b) 200 (c) 250 (d) 400

99. A compound microscope is adjusted for viewing the distant image of an object, the distance of the object from the object glass is now slightly increased, what re-adjustment of the instrument would be necessary for obtaining a distant image again

(a) Objective should be moved away from the eye-piece (b) Eye-piece should be moved towards the objective

(c) Both should be moved towards each other (d) Both should be moved away from each other

100. When the object is self-luminous, the resolving power of a microscope is given by the expression

(a) $\frac{2\mu \sin\theta}{\lambda}$ (b) $\frac{\mu \sin\theta}{\lambda}$ (c) $\frac{2\mu \cos\theta}{\lambda}$ (d) $\frac{2\mu}{\lambda}$

101. In a compound microscope, maximum magnification is obtained when the final image

(a) Is formed at infinity (b) Is formed at the least of distinct vision

(c) Coincides with the object (d) Coincides with the objective lens

102. How should people wearing spectacles work with a microscope

(a) They should keep on wearing their spectacles

(b) They should take off their spectacles

(c) They may keep on wearing or take off their spectacles, It makes no difference

(d) They cannot use a microscope at all

Telescope

103. The focal length of the objective and eyepiece of an astronomical telescope for normal adjustments are 50 *cm* and 5 *cm*. The length of the telescope should be **[MP PMT 2004]**

(a) 50 *cm* (b) 55 *cm* (c) 60 *cm* (d) 45 *cm*

104. The resolving power of an astronomical telescope is 0.2 *seconds*. If the central half portion of the objective lens is covered, the resolving power will be **[MP PMT 2004]**

(a) 0.1 *sec* (b) 0.2 *sec* (c) 1.0 *sec* (d) 0.6 *sec*

105. If F_o and F_e are the focal length of the objective and eye-piece respectively of a telescope, then its magnifying power will be

[CPMT 1977, 82, 97, 99, 2003; SCRA 1994; KCET (Engg./Med.) 1999; Pb. PMT 2000; BHU 2001; BCECE 2003, 2004]

(a) $F_o + F_e$ (b) $F_o \times F_e$ (c) F_o / F_e (d) $\frac{1}{2}(F_o + F_e)$

106. The length of an astronomical telescope for normal vision (relaxed eye) (f_o = focal length of objective lens and f_e = focal length of eye lens) is **[EAMCET (Med.) 1995; MP PAT 1996; CPMT 1999; BVP 2003]**

(a) $f_o \times f_e$ (b) $\frac{f_o}{f_e}$ (c) $f_o + f_e$ (d) $f_o - f_e$

107. A telescope of diameter 2*m* uses light of wavelength 5000 *Å* for viewing stars. The minimum angular separation between two stars whose image is just resolved by this telescope is **[MP PET 2003]**

(a) 4×10^{-4} *rad* (b) 0.25×10^{-6} *rad* (c) 0.31×10^{-6} *rad* (d) 5.0×10^{-3} *rad*

108. The aperture of the objective lens of a telescope is made large so as to **[AIEEE 2003; KCET 2003]**

(a) Increase the magnifying power of the telescope (b) Increase the resolving power of the telescope

(c) Make image aberration less (d) Focus on distant objects

109. The distance of the moon from earth is 3.8×10^{5} *km*. The eye is most sensitive to light of wavelength 5500 *Å*. The separation of two points on the moon that can be resolved by a 500 *cm* telescope will be **[AMU (Med.) 2002]**

(a) 51 *m* (b) 60 *m* (c) 70 *m* (d) All of the above

110. To increase both the resolving power and magnifying power of a telescope **[Kerala PET 2002; KCET (Engg.) 2002]**

(a) Both the focal length and aperture of the objective has to be increased

(b) The focal length of the objective has to be increased

(c) The aperture of the objective has to be increased

(d) The wavelength of light has to be decreased

111. The focal lengths of the objective and eye lenses of a telescope are respectively 200*cm* and 5*cm*. The maximum magnifying power of the telescope will be **[MP PMT/PET 1998; JIPMER 2001, 2002]**

(a) – 40 (b) – 48 (c) – 60 (d) – 100

112. A telescope has an objective of focal length 50 *cm* and an eye piece of focal length 5 *cm*. The least distance of distinct vision is 25 *cm*. The telescope is focussed for distinct vision on a scale 200 *cm* away. The separation between the objective and the eye-piece is **[Kerala PET 2002]**

(a) 75 *cm* (b) 60 *cm* (c) 71 *cm* (d) 74 *cm*

113. In a laboratory four convex lenses L_1, L_2, L_3 and L_4 of focal lengths 2, 4, 6 and 8*cm* respectively are available. Two of these lenses form a telescope of length 10*cm* and magnifying power 4. The objective and eye lenses are **[MP PM**

(a) L_2, L_3 (b) L_1, L_4 (c) L_3, L_2 (d) L_4, L_1

114. Four lenses of focal length + 15 *cm*, + 20 *cm*, + 150 *cm* and + 250 *cm* are available for making an astronomical telescope. To produce the largest magnification, the focal length of the eye-piece should be **[CPMT 2001; AIIMS 2001]**

(a) + 15 *cm* (b) + 20 *cm* (c) + 150 *cm* (d) + 250 *cm*

115. In a terrestrial telescope, the focal length of objective is 90 *cm*, of inverting lens is 5 *cm* and of eye lens is 6 *cm*. If the final image is at 30 *cm*, then the magnification will be **[DPMT 2001]**

(a) 21 (b) 12 (c) 18 (d) 15

116. The focal lengths of the objective and the eyepiece of an astronomical telescope are 20 *cm* and 5 *cm* respectively. If the final image is formed at a distance of 30 *cm* from the eye piece, find the separation between the lenses for distinct vision **[BHU (Med.) 2000]**

(a) 32.4 *cm* (b) 42.3 *cm* (c) 24.3 *cm* (d) 30.24 *cm*

117. Resolving power of reflecting type telescope increases with **[DPMT 2000]**

(a) Decrease in wavelength of incident light (b) Increase in wavelength of incident light

(c) Increase in diameter of objective lens (d) None of these

118. A planet is observed by an astronomical refracting telescope having an objective of focal length 16 *m* and an eye-piece of focal length 2*cm* **[IIT-JEE 1992; Roorkee 2000]**

(a) The distance between the objective and the eye-piece is 16.02 *m*

(b) The angular magnification of the planet is 800

(c) The image of the planet is inverted

(d) All of the above

119. The astronomical telescope consists of objective and eye-piece. The focal length of the objective is **[AIIMS 1998; BHU 20**

(a) Equal to that of the eye-piece (b) Greater than that of the eye-piece

(c) Shorter than that of the eye-piece (d) Five times shorter than that of the eye-piece

120. The diameter of the objective of a telescope is a, the magnifying power is m and wavelength of light is λ. The resolving power of the telescope is **[MP PMT 2000]**

(a) $(1.22\lambda)/a$ (b) $(1.22a)/\lambda$ (c) $\lambda m/(1.22a)$ (d) $a/(1.22\lambda m)$

121. An astronomical telescope has an angular magnification of magnitude 5 for distant objects. The separation between the objective and the eyepiece is 36 *cm* and final image is formed at infinity. The focal lengths of the objective and eyepiece are respectively

[IIT-JEE 1989; MP PET 1995; JIPMER 2000]

(a) 20 *cm*, 16 *cm* (b) 50 *cm*, 10 *cm* (c) 30 *cm*, 6 *cm* (d) 45 *cm*, –9 *cm*

122. A photograph of the moon was taken with telescope. Later on, it was found that a housefly was sitting on the objective lens of the telescope. In photograph **[NCERT 1970; MP PET 1999]**

(a) The image of housefly will be reduced (b) There is a reduction in the intensity of the image

(c) There is an increase in the intensity of the image (d) The image of the housefly will be enlarged

123. The magnifying power of a telescope is M. If the focal length of eye piece is doubled, then the magnifying power will become

[Haryana CEET 1998]

(a) $2M$ (b) $M/2$ (c) $\sqrt{2M}$ (d) $3M$

124. The minimum magnifying power of a telescope is M. If the focal length of its eyelens is halved, the magnifying power will become

[MP PMT/PET 1998]

(a) $M/2$ (b) $2M$ (c) $3M$ (d) $4M$

125. The final image in an astronomical telescope is **[EAMCET (Engg.) 1998]**

(a) Real and errect (b) Virtual and inverted (c) Real and inverted (d) Virtual and errect

126. The astronomical telescope has two lenses of focal powers 0.5 D and 20 D. Its magnifying power will be **[CPMT 1997]**

(a) 40 (b) 10 (c) 100 (d) 35

127. An astronomical telescope of ten-fold angular magnification has a length of 44 *cm*. The focal length of the objective is **[CBSE PMT 1997]**

(a) 4 *cm* (b) 40 *cm* (c) 44 *cm* (d) 440 *cm*

128. A telescope consisting of an objective of focal length 100 *cm* and a single eyes lens of focal length 10 *cm* is focussed on a distant object in such a way that parallel rays emerge from the eye lens. If the object subtends an angle of 2° at the objective, the angular width of the image is **[JIPMER 1997]**

(a) 20° (b) 1/6° (c) 10° (d) 24°

129. When diameter of the aperture of the objective of an astronomical telescope is increased, its **[MP PMT 1997]**

(a) Magnifying power is increased and resolving power is decreased

(b) Magnifying power and resolving power both are increased

(c) Magnifying power remains the same but resolving power is increased

(d) Magnifying power and resolving power both are decreased

130. The focal length of objective and eye-piece of a telescope are 100 *cm* and 5 *cm* respectively. Final image is formed at least distance of distinct vision. The magnification of telescope is **[RPET 1997]**

(a) 20 (b) 24 (c) 30 (d) 36

131. A simple telescope, consisting of an objective of focal length 60 *cm* and single eye lens of focal length 5 *cm* is focussed on a distant object in such a way that parallel rays comes out from the eye lens. If the object subtends an angle 2° at the objective, the angular width of the image **[CPMT 1979; NCERT 1980; MP PET 1992; JIPMER 1997]**

(a) 10° (b) 24° (c) 50° (d) 1/6°

132. The diameter of the objective of the telescope is 0.1 *metre* and wavelength of light is 6000 *Å*. Its resolving power would be approximately **[MP PET 1997]**

(a) 7.32×10^{-6} *radian* (b) 1.36×10^{6} *radian* (c) 7.32×10^{-5} *radian* (d) 1.36×10^{5} *radian*

133. A Gallilean telescope has objective and eye-piece of focal lengths 200 *cm* and 2 *cm* respectively. The magnifying power of the telescope for normal vision is **[MP PMT 1996]**

(a) 90 (b) 100 (c) 108 (d) 198

134. All of the following statements are correct except **[Manipal MEE 1995]**

(a) The total focal length of an astronomical telescope is the sum of the focal lengths of its two lenses

(b) The image formed by the astronomical telescope is always erect because the effect of the combination of the two lenses its divergent

(c) The magnification of an astronomical telescope can be increased by decreasing the focal length of the eye-piece

(d) The magnifying power of the refracting type of astronomical telescope is the ratio of the focal length of the objective to that of the eye-piece

135. The length of a telescope is 36 *cm*. The focal length of its lenses can be **[Bihar MEE 1995]**

(a) 30 *cm*, 6 *cm* (b) – 30 *cm*, – 6 *cm* (c) – 30 *cm*, – 6 *cm* (d) – 30 *cm*, 6 *cm*

136. The diameter of the objective lens of telescope is 5.0 *m* and wavelength of light is 6000 *Å*. The limit of resolution of this telescope will be **[MP PMT 1994]**

(a) 0.03 *sec* (b) 3.03 *sec* (c) 0.06 *sec* (d) 0.15 *sec*

137. If tube length of astronomical telescope is 105 *cm* and magnifying power is 20 for normal setting, calculate the focal length of objective **[AFMC 1994]**

(a) 100 *cm* (b) 10 *cm* (c) 20 *cm* (d) 25 *cm*

138. Radio telescope is used to see **[AFMC 1994]**

(a) Distant start and planets (b) Sun and to measure its temperature

(c) Stars and to measures diameters (d) None of these

139. Four lenses with focal lens ± 15 *cm* and ± 150 *cm* are being placed for used as a telescopic objective. The focal length of the lens which produces the largest magnification with a given eye-piece is **[CBSE PMT 1994]**

(a) –15 *cm* (b) +150 *cm* (c) –150 *cm* (d) +15 *cm*

140. The image of a star (effectively a point source) is made by convergent lens of focal length 50 *cm* and diameter of aperture 5.0 *cm*. If the lens is ideal, and the effective wavelength in image formation is taken as 5×10^{-5} *cm*, the diameter of the image formed will be nearest to **[NSEP 1994]**

(a) Zero (b) 10^{-6} *cm* (c) 10^{-5} *cm* (d) 10^{-3} *cm*

141. To increase the magnifying power of telescope (f_o = focal length of the objective and f_e = focal length of the eye lens)

[MP PET/PMT 1988; MP PMT 1992, 94]

(a) f_o should be large and f_e should be small (b) f_o should be small and f_e should be large

(c) f_o and f_e both should be large (d) f_o and f_e both should be small

142. The limit of resolution of a 100 *cm* telescope ($\lambda = 5.5 \times 10^{-7}\ m$) is **[BHU 1993]**

(a) 0.14" (b) 0.3" (c) 1′ (d) 1"

143. In a reflecting astronomical telescope, if the objective (a spherical mirror) is replaced by a parabolic mirror of the same focal length and aperture, then **[IIT-JEE 1993]**

(a) The final image will be erect (b) The larger image will be obtained

(c) The telescope will gather more light (d) Spherical aberration will be absent

144. A planet is observed by an astronomical refracting telescope having an objective of focal length 16 *m* and an eyepiece of focal length 2 *cm* **[IIT-JEE 1993]**

(a) The distance between the objective and the eyepiece is 16.02 *m*

(b) The angular magnification of the planet is 800

(c) The image of the planet is inverted

(d) The objective is larger than the eyepiece

145. The average distance between the earth and moon is $38.6 \times 10^4\ km$. The minimum separation between the two points on the surface of the moon that can be resolved by a telescope whose objective lens has a diameter of 5 *m* with λ = 6000 *Å* is **[MP PMT 1993]**

(a) 5.65 *m* (b) 28.25 *m* (c) 11.30 *m* (d) 56.51 *m*

146. The focal length of the objective and eye piece of a telescope are respectively 60 *cm* and 10 *cm*. The magnitude of the magnifying power when the image is formed at infinity is **[MP PET 1991]**

(a) 50 (b) 6 (c) 70 (d) 5

147. The focal length of an objective of a telescope is 3 *metre* and diameter 15 *cm*. Assuming for a normal eye, the diameter of the pupil is 3 *mm* for its complete use, the focal length of eye piece must be **[MP PET 1989]**

(a) 6 *cm* (b) 6.3 *cm* (c) 20 *cm* (d) 60 *cm*

148. An opera glass (Gallilean telescope) measures 9 *cm* from the objective to the eyepiece. The focal length of the objective is 15 *cm*. Its magnifying power is **[DPMT 1988]**

(a) 2.5 (b) 2/5 (c) 5/3 (d) 0.4

149. The focal length of objective and eye lens of a astronomical telescope are respectively 2 *m* and 5 *cm*. Final image is formed at (i) least distance of distinct vision (ii) infinity. The magnifying power in both cases will be **[MP PM**

(a) – 48, – 40 (b) – 40, – 48 (c) – 40, 48 (d) – 48, 40

150. An optical device that enables an observer to see over or around opaque objects, is called **[CPMT 1986]**

(a) Microscope (b) Telescope (c) Periscope (d) Hydrometer

151. The magnifying power of a telescope can be increased by **[CPMT 1979]**

(a) Increasing focal length of the system (b) Fitting eye piece of high power

(c) Fitting eye piece of low power (d) Increasing the distance of objects

152. An achromatic telescope objective is to be made by combining the lenses of flint and crown glasses. This proper choice is **[CPMT 1977]**

(a) Convergent of crown and divergent of flint (b) Divergent of crown and convergent of flint

(c) Both divergent (d) Both convergent

153. An observer looks at a tree of height 15 *m* with a telescope of magnifying power 10. To him, the tree appears **[CPMT 19**

(a) 10 times taller (b) 15 times taller (c) 10 times nearer (d) 15 times nearer

154. The magnification produced by an astronomical telescope for normal adjustment is 10 and the length of the telescope is 1.1 *m*. The magnification when the image is formed at least distance of distinct vision (D = 25 *cm*) is

(a) 14 (b) 6 (c) 16 (d) 18

155. The objective of a telescope has a focal length of 1.2 *m*. it is used to view a 10.0 *m* tall tower 2 *km* away. What is the height of the image of the tower formed by the objective

(a) 2 *mm* (b) 4 *mm* (c) 6 *mm* (d) 8 *mm*

156. A giant telescope in an observatory has an objective of focal length 19 *m* and an eye-piece of focal length 1.0 *cm*. In normal adjustment, the telescope is used to view the moon. What is the diameter of the image of the moon formed by the objective? The diameter of the moon is $3.5\times10^{6}\ m$ and the radius of the lunar orbit round the earth is $3.8\times10^{8}\ m$

(a) 10 *cm* (b) 12.5 *cm* (c) 15 *cm* (d) 17.5 *cm*

157. The aperture of the largest telescope in the world is ≈ 5 *metre*. If the separation between the moon and the earth is $\approx 4\times10^{5}\ km$ and the wavelength of the visible light is $\cong 5000\ \mathring{A}$, then the minimum separation between the objects on the surface of the moon which can be just resolved is

(a) 1 *metre* approximately (b) 10 *metre* approximately (c) 50 *metre* approximately (d) 200 *metre* approximately

158. In Galileo's telescope, magnifying power for normal vision is 20 and power of eye-piece is –20 *D*. Distance between the objective and eye-piece should be

(a) 90 *cm* (b) 95 *cm* (c) 100 *cm* (d) 105 *cm*

159. The least resolve angle by a telescope using objective of aperture 5 *m* and light of wavelength = 4000 *A.U.* is nearly

(a) $\frac{1}{50}^{\circ}$ (b) $\frac{1}{50}\ sec$ (c) $\frac{1}{50}\ minute$ (d) $\frac{1}{500}\ sec$

160. The limit of resolution of a 10 *cm* telescope for visible light of wavelength 6000 $\mathring{A}$ is approximately

(a) 0.1 *s* or arc (b) 30° (c) $\left(\frac{1}{6}\right)^{o}$ (d) None of these

161. An eye-piece of a telescope with a magnification of 100 has a power of 20 diopters. The object of this telescope has a power of

(a) 2 *diopters* (b) 0.2 *diopters* (c) 2000 *diopters* (d) 20 *diopters*

162. The Yerkes Observatory telescope has a large telescope with objective of diameter of about 1 *m*. Assuming wavelength of light to be $6\times10^{-7}m$, the angular distance θ between two stars which can just be resolved is

(a) $(7.3\times10^{-7})^{\circ}$ (b) $7.3\times10^{-7}\ rad$ (c) $\frac{1}{40}$ of a second (d) None of these

163. A Galilean telescope measures 9 *cm* from the objective to the eye-piece. The focal length of the objective is 15 *cm*. Its magnifying power is

(a) 2.5 (b) 2/5 (c) 5/3 (d) 0.4

164. For seeing a cricket match, we prefer binoculars to the terrestrial telescope, because

(a) Binoculars give three-dimensional view (b) Terrestrial telescope gives inverted image

(c) To avoid chromatic aberration (d) To have larger magnification

165. A simple two lens telescope has an objective of focal length 50 *cm* and an eye-piece of 2.5 *cm*. The telescope is pointed at an object at a very large distance which subtends at an angle of 1 *milliradian* on the naked eye. The eye piece is adjusted so that the final virtual image is formed at infinity. The size of the real image formed by the objective is

(a) 5 *mm* (b) 1 *mm* (c) 0.5 *mm* (d) 0.1 *mm*

166. The objective of a telescope, after focussing for infinity is taken out and a slit of length L is placed in its position. A sharp image of the slit is formed by the eye-piece at a certain distance from it on the other side. The length of this image is l, then magnification of telescope is

(a) $\frac{l}{2L}$ (b) $\frac{2L}{l}$ (c) $\frac{l}{L}$ (d) $\frac{L}{l}$

167. An astronomical telescope in normal adjustment receives light from a distant source S. The tube length is now decreased slightly

(a) A virtual image of S will be formed at a finite distance

(b) No image will be formed

(c) A small, real image of S will be formed behind the eye-piece, close to it

(d) A large, real image of S will be formed behind the eye-piece, far away from it

168. A telescope consisting of object glass of power + 2 D and eye-glass of power + 20 D is focussed on an object $1m$ from the object glass. The final image is seen with completely relaxed eye. The magnifying power of the telescope is

(a) 20 (b) 41 (c) 24 (d) 49.2

169. An astronomical telescope and a Galilean telescope use identical objective lenses. They have the same magnification, when both are in normal adjustment. The eye-piece of the astronomical telescope has a focal length f

(a) The tube lengths of the two telescopes differ by f (b) The tube lengths of the two telescopes differ by $2f$

(c) The Galilean telescope has a shorter tube length (d) The Galilean telescope has a longer tube length

Answer Sheet

Assignments

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
a	d	b	a	c	a	b	b	c	a	b	b	d	b	a	d	d	a	c	a
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
b	c	c	c	b	b	c	b	c	a	b	b	c	b	d	c	c	a	a	b
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
a	d	a	c	a	d	c	b	d	b	c	c	b	a	d	a	c	a	b	d
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
c	b	d	d	c	a	a	b	c	b	d	a	d	d	d	a	c	b	b	d
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
d	d	d	c	b	c	a	a	b	c	c	b,d	a	b	d	c	d	b	b	a
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
b	b	b	c	c	c	c	b	a	a	b	c	d	a	c	c	a, c	d	b	d
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
c	b	b	b	b	a	b	a	c	b	b	d	b	b	a	a	a	a	b	d
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
a	a	d	a	d	b	a	a	a	c	b	a	c	a	c	d	c	b	b	a
161	162	163	164	165	166	167	168	169											
b	b	a	a	c	d	a	b	b, c											