VINAYAKA MISSION'S RESEARCH FOUNDATIONS, SALEM
(Deemed to be University)

B.OPTOMETRY DEGREE EXAMINATION – August 2019
First Year
GEOMETRIC OPTICS

Time: Three hours   Maximum: 80 marks

I Choose the best answer   (5 x 1 = 5)

1. A plano convex lens of refractive index 1.6, has a radius of curvature of 60 cm. The focal length of the lens is _____?
   a) 50 cm   b) 200 cm
   c) 100 cm   d) 400 cm

2. If fo is focal length of objective and fe is focal length of eye piece, then magnification of a refracting (M) telescope can be determined as
   a) M = fo/ fe   b) M = fo - fe
   c) M = fo + fe   d) M = fe/ fo

3. "100" in colour rendering Index means
   a) No colour distortion   b) Partial colour distortion
   c) Incomplete colour distortion   d) Complete colour distortion

4. Following is true about Specific absorption ratio (SAR), EXCEPT
   a) Measure of rate at which energy
   b) Units: W/ m
   c) > 3000MHz : Absorbed in skin
   d) < 3000MHz : Penetrates skin, absorbed in tissue

5. _____ LASER is an occupational hazard
   a) 0.01 W   b) 0.0001 W
   c) 0.001 W   d) 0.1 W

II Fill in the blanks   (5 x 1 = 5)

1. The _____ the frequency of a wave, the lower the wave period.
2. _____ telescopes uses a convex and concave lens.
3. A magnifying lens is a _____ lens.
4. _____ of the eye is analogous to the black box of a camera.
5. If the thin lens yields a negative focal length, then the lens is a _____ lens.

6.

III Answer **ALL** questions: (10 x 2 = 20)

1. Name the electromagnetic radiation for
   a. Hot bodies
   b. FM Radio
   c. Vision
   d. Radar

2. State Snell's law with a neat diagram.
3. Define the types of glare.
4. Define depreciation factor. Also mention its formula.
5. What is modulation transfer function?
6. Illustrate a meniscus, biconvex and plano convex lens with an example.
7. List the factors affecting visual tasks.
8. What is an achromatic doublet?
9. Interval of sturm.
10. Illustrate: parallel rays of light hitting a -5.00D lens. Where is the secondary focal point?

IV Write any **FIVE** answers of the following: (5 x 6 = 30)

1. Transposition: Write the following prescription in other forms
    a. +3.00DS/ -2.00DC* 10
    b. -5.00DC* 45/ +2.00DC* 135
2. Resolving power of the eye and an instrument.
3. What are the advantages and disadvantages of halogen lamps?
4. Define
    a. Entrance pupil
    b. Aperture stop
    c. Vignetting
    d. Depth of focus
5. Illustrate the optics of Galilean telescope. Write 2 uses of the telescope.
6. Differentiate sold state, gas and semiconductor lasers
7. Units of photometry.

V Write any **TWO** essays of the following: (2 x 10 = 20)

1. Find the back vertex and front vertex focal length, entrance pupil and exit pupil of a Gull- strand eye model (3 mm pupil) which has the following constants
        Corneal anterior surface radius: 7.7 mm
        Corneal posterior surface radius: 6.8 mm
        Lens anterior surface: 10 mm
        Lens posterior surface: - 6 mm
        Corneal refractive index: 1.376
        Aqueous/ Vitreous refractive index: 1.336
        Lens index: 1.406
2. Write in detail on all monochromatic aberrations with diagrams.
3. Write on additive and subtractive theories of colour (with illustrations). Define
        a. Colour temperature
        b. Colour rendering index.

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