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

B.OPTOMETRY DEGREE EXAMINATION – September 2021
First Year
GEOMETRIC OPTICS

Time: Three hours   Maximum: 80 marks

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

1. If the magnification is -0.60, then the image is
   a) Inverted and enlarged   b) Erect and enlarged
   c) Erect and diminished   d) Inverted and diminished

2. All are true about total internal reflection except
   a) In communications, it is used to transmit telephone, internet, and cable TV signals
   b) Shining of new utensils is due to total internal reflection
   c) Diamonds sparkle due to total internal reflection.
   d) Endoscopes are used to explore the body through various orifices or minor incisions, based on the transmission of light through optical fibers.

3. _____ is the smallest image of the apertures due to all the optical elements after the apertures.
   a) Exit Pupil   b) Entrance Pupil.
   c) Nodal point   d) Principal point

4. Unit of luminous efficacy is
   a) Lumens   b) Lux
   c) Lumens/watt   d) Candela/m^2

5. Ideal illuminance lux for consulting room of an optometrist:
   a) 200   b) 300
   c) 400   d) 100

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

1. The visible light we see is part of the _____.
2. Oblique astigmatism is an _____ axis aberration.
3. _____ occurs when the image falls in front the retina.
4. _____ Points are units of angular magnification for a focal system.
5. The angular _____ is defined as angle between the two extreme colours of light when light passes through a prism.

(p.t.o)

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

1. Illustrate specular and diffuse reflection
2. Name one source of
   a) UV Rays.
   b) IR rays
   c) Microwaves.
   d) Radio waves.
3. Determine the refractive index of the material of the prism having angle of prism $A = 30^{\circ}$ and angle of minimum deviation $D = 45^{\circ}$
4. Define an illustrate umbra and penumbra.
5. Define visual fatigue and disability glare.
6. Define utilization factor. Also mention its formula.
7. Define prism dioptre and Prentice Rule.
8. What is point spread function?
9. What is difference between spontaneous and stimulated emission?
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. Illustrate and explain the four methods of light control.
2. Transposition: Write the following prescription in other forms.
   a. +3.00DS/-2.00DC*10
   b. -5.00DC*45/+2.00DC*135
3. Explain the optics and working of a microscope.
4. What are the advantages and disadvantages of tungsten incandescent lamps?
5. Calculate the front vertex and back vertex power for a thick lens of 9mm having a refractive index of 1.6 and $F_1 = +9.00$ DS and $F_2 =$ Plano.
6. Illustrate refraction by a cylindrical lens. What are the principal meridians of the lens and where is the circle of lease confusion.
7. Define
   a. Exit pupil   b. Field stop.
   c. Vignetting   d. Depth of field

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

1. Write on additive and subtractive theories of colour (with illustrations). Define.
   a. Colour temperature
   b. Colour rendering index
2. Write in detail on Ruby LASER.
3. Compare and contrast Galilean and Keplerian telescopes. Illustrate the optics of both.

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