

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI

SCHOOL OF HEALTH TECHNOLOGY

DEPARTMENT OF OPTOMETRY

2011/2012 RAIN SEMESTER EXAMINATION

OPT 302: OPHTHALMIC OPTICS AND MATERIALS 11

2 UNITS

INSTRUCTIONS : ANSWER A TOTAL OF FOUR (4) QUESTIONS WITH ATLEAST ONE(1) QUESTION FROM EACH SECTION.

TIME : 2 HOURS

SECTION A

1.(a). A lens with a refractive index of 1.52 has a front radius of curvature of 10cm. If the power of the lens is +5.00D, what is the radius of curvature of the back surface?

(b). A lens with a front surface power of +2.00D and a back surface power of -4.50D has a center thickness of 9mm. If the index of refraction is 1.50, what is the back vertex power of the lens?

2.(a) Define (i) Equivalent Power of a Lens (ii) Nominal power of a lens (iii) True power of a lens (iv) Neutralizing power of a lens (v) Sagittal value of a lens.

(b) A lens calipers 1mm at the thinnest edge on 40mm diameter in the 90th meridian and 2mm at the thickest edge in the 180th meridian on 50mm diameter. If it measures 3mm at the optical center, What is the power of the lens assuming the refractive index of the lens is 1.50?

3.(a) A lens marked +8.00D is used on a lens with refractive index of 1.52. Calculate the true surface power.

(b) An 8mm double convex lens has a +8.00D power on each surface. Assuming the refractive index of the lens to be 1.523, what is the equivalent power?

SECTION B

1a(i). What is a toric lens? (ii) Describe with the aid of diagrams, the form of a toroidal surface.

(b) A thin lens is to have a power of +2.50D in the vertical meridian and +1.25D in the horizontal meridian. Write out its prescription in the following forms:- (i) In plus cylinder form (ii) in minus cylinder form (iii) in toric form with a +6.00D base (iv) in toric form with a -4.00D base.

2a Transpose the following prescriptions into toric form with +7.00D Sphere curves. (i) +3.50DS/-2.50DCXH (ii) -8.00DS/-2.00DCXV

(b) Transpose the following prescriptions into toric form with -7.00D Sphere curves (i) -3.25DS/-0.25DCX90 (ii) +0.75DS/-1.25DCX90

SECTION C

1(a) What is a lens? (b) State three uses of a lens. (c) With the aid of diagrams, describe the various kinds of lenses. (d) How do lenses form images? (e) Differentiate between Single vision, Segmented multifocal lens and Progressive lenses.

2(a) What is a meniscus lens? (b) State simple equations for determining the following for a meniscus lens – Centre thickness; Radius of the lens; Sagittal depth (c) What is the centre thickness of a -2.00D lens that is edged to a horizontally oval shape? The lens parameters are:- $F_1=10.00D$ front surface power; F_2 =back surface power; $n=1.53$; minimum edge thickness=1.5mm; $A=50mm$. This is the horizontal dimension of the oval shape; $B=30mm$. This is the horizontal dimension of the oval shape.