

(4)

(J) What are retardation plates?

Dejecevokeā heeōkeāeUelWkeālee neēer nīP

Unit-I / FkeāF-I

7 1/2

2. (a) Find an expression for the path difference between the rays reflected from upper and lower surfaces of a parallel thin film. Why interference patterns in reflected and transmitted light are complementary to each other.

Skeā heleueer eheāuce mes hejeleēleke ōkeāeMe keā heLeevleje keā eueUes JUelpakeā ōehle keāeēpeUes hejeleēleke leLee hejiele ōkeāeMe celWēāvpe heēve&Skeā omejskeā keāleēWhej keā neēes nP

2. (b) How Newton's rings are formed? Prove that in reflected light diameter of the dark rings are proportional to the square root of natural numbers.

vūēēve JueUe keāmesyeveles nP eheāe keāeēpeUes ekeā hejeleēleke ōkeāeMe celWDeohle JueUeWkeāe JUeeme ōekeāēlekeā meK UēeDeel keā Jieēēue keā Deveēāceveēeēer neēee n_m

S-603

A

(Printed Pages 8)

Roll No. _____

S-603

B.Sc. (Part-I) Examination, 2015

(Regular & Exempted)

PHYSICS

Third Paper

(Optics)

Time Allowed : Three Hours] [Maximum Marks : 50

Note : Question No.1 is compulsory and attempt one question from each units I, II, III and IV. Thus answer five questions in all.

ŌelMve meē 1 DeēreJeeUe&nwleLee ŌelUekeā FkeāeF&I, II, III SJeI IV me: Skeā ŌelMve keāeēpeS- Fme Ōekeāej keēue heēēle ŌelMveelWkeā Gōej oēēpeS-

1. Answer the following : $2 \times 10 = 20$

eēveēveēeēeēe keā Gōej oēēpeS :

- (a) In Young's double slit experiment, the angular width of a fringe formed on a distant screen is 1° . The wavelength of

P.T.O.

(2)

light used is 6000\AA . What is the spacing between the slits?

Uebe eEkeā-dhuesŠ ņeUeeie cellSkeā dzeāvpe keāer k eSeale UeeleF&1°
nW Ueeb ņeUeeie keāer ielUeer ņekeāeMe keāer lej lie oņUee&6000Å
nes lees dhuesŠellkeā ceņUee ojjer keālee nW

- (b) What will happen in Newton's rings experiment, if the glass plate is replaced by a plane mirror?

vUeeSve JeeleUe ņeUeeie cellUeeb keāeUe keāer huesŠ eāes Skeā
meceleue oheCe mes ņeelemLeeehele keāj ebUee peelees lees keālee
neēee?

- (c) What are the differences between the interference & diffraction?

JUeelekeājCe leLee eileJeeleUe cellkeālee-keālee Devlej nW

- (d) Compare the working of a zone plate with that of a convergent lens.

Skeā peesve heebkeāe keāer keāeUeeleUe keāer legreeve, Skeā Gōeue
ueesme mes keāeepēUes-

(3)

- (e) What is meant by grating element?

«eeŠlie SueeceeŠ mes keālee DeelVeeUe nW

- (f) Distinguish between dispersive power and resolving power of a grating.

«eeŠlie keāer eile#eeCe #eeleee leLee eileYeove #eeleee cellDevlej
mhe° keāeepēUes

- (g) How would you convert a left handed circularly polarised light beam into a right handed circularly polarised beam?

Skeā JeeceeJeeleUeeUe ņekeāeMe keāer ekeāj Ce keāe Deche oee#eCeJeeleee
JeeleUe ņekeāeMe keāer ekeāj Ce cellkeāemes heefJeeleUe keāj VeeŠ?

- (h) Show that in case of reflection at Brewster-angle, reflected and refracted rays are mutually perpendicular.

ebKeeFūsekeā yeeŠj-keāeCe hej hejeleUe neeshej hejeleUe
leLee DeheJeeleUe ekeāj Cellhejmhej uecyeele neeēer nW

- (i) What is specific rotation?

eileUe° leCeUe keālee nW

(8)

Unit-IV / F-IV

7 1/2

8. What do you understand by plane, circularly & elliptically polarised light. Describe the method to detect plane, circularly and elliptically polarised light with the help of Nicol prism and quarter wave plate.

meceue, Jeede leee oelaeede Oeile OkaeMe mes Dehe kaee mecePeles n?

meceue, Jeede leee oelaeede Oeile OkaeMe kaee heje#eCe, ekeaeue epece leee Uejelele lej he hoes kaer ceoo mes keime kaaj ne?

9. Write short notes on the following :

evecueeKele hej me#hle eShhaCeUeeB eueKedes :

(I) Biquartz Polarimeter

yeFkaešpe heesjeceesj

(II) Jones's matrix of quarter wave plate

Uejelele lej he hoes ntejpeesme cešKeime

(5)

3. Explain the principle of the Fabry-Perot interferometer - obtain an expression for the intensity - distribution in the transmitted light and discuss the sharpness of the fringes obtained.

Ska hae#hej es Juelekaej Ceceheerkae emeae-eve le kaee GuueKe kaeepeles hej iele OkaeMe cellerelee eleej Ce kaee Juepekae Oehle kaeepeles lelee Oehle eba#peelkaer leerelee kaer JueKuee kaeepeles

Unit-II / F-II

7 1/2

4. (a) Describe the construction of a zone plate and explain its working. Clearly explain, how it behaves like a lens of multiple foc.

Ska peesve hee#kae kaer j Uevee lelee kaeeUeCeueer kaee JeCeite kaeepeles mecePeFues ekae ekaeme Okaeje Ska peesve hee#kae yenhaeKaame uesme pemee kaeeUe#kaej leer n#

4. (b) What is the radius of the first zone of focal length 15 cm for the light of wavelength of 6000Å.

(6)

15 meseer. heäkeäme oij er Jeeues DeLece peesre keä eüelles peer
6000Å le jheoüe& keä DekeäMe mes oehle niw keäer ešepüee
%eete keäeppeles

- 5. (a) Derive expression of intensity distribution of Fraunhofer diffraction at double slit. Draw Intensity distribution curve.

eÉkeä-ämueš hej neäevenekä j eüelelece cell teeselee eüelej Ce
niw jüepkeä Dehle keäeppeles leLee teeselee eüelej Ce j eä keäer
oMeeFÜes

- 5. (b) Find the half angular width of the central bright maximum in the Fraunhofer diffraction pattern of a slit of width 12×10^{-5} cm.

when the slit is illuminated by monochromatic light of wavelength 6000Å .
Skeä 12×10^{-5} meseer. Üecler ämueš mes Dehle Deäevenekä j
eüelelece cell keäivöete GefÜe%o keäer Deäe keäeS eeüe Üecler eF & %eete
keäeppeles peyeekä ämueš keäes 6000Å le jhe oüe& keä
DekeäMe mes DekeäMele ekeäüee ieüee niw

(7)

Unit-III / FkeäF-III

7 1/2

- 6. What is resolving power? Discuss Rayleigh criterion of resolution briefly. Find the expression for resolving power of a telescope.

eüeYeöve #ecele keäüee neteer niw eüeYeöve keä keä emeäeevle
keäer eüelešeeve keäeppeles oij oMeeä keäer eüeYeöve #ecele keäe jüepkeä
Dehle keäeppeles

- 7. (a) What is babinet compensator? Discuss the construction and working of it. What are its advantage.

yešjeveš keächesvemes j keäüee neteer niw Fmekeäer leLee
keäeüeeDe mecePeeFÜes Fmekeä keäüee ueeYe niw

- 7. (b) Calculate the thickness of quarter wave plate, Given that

$\mu_e = 1.553; \mu_o = 1.544, \lambda = 6 \times 10^{-5} \text{ cm}$

Üelej eüelle Jeye huesš keäer cees eF & keäer ieCeeve keäeppeles :

eüüee niw:

$\mu_e = 1.553; \mu_o = 1.544, \lambda = 6 \times 10^{-5} \text{ meseer}$