OR

¡âwqnã ârÂÀ¡ ¨uà Ñ¡ ? ¢y§ý ¡ÀàŽàuà¡ªà âvâh¥ ñ

What is aplanatic points? Write down its applications.

ŽàÎÀà-3. ây÷ §ýLâk¥ â§ý ¥§ý qmvã âÄýÌt õàÊà ¥§ýw½àJ ŽàS§ýàÎà y¡ rÂàã qÊàwâm¡m mnà qàÊªàm Íuâm§ýÊ½à âÄýÂk¡ ¥§ý-ÀyÊ¡ §ýL q¡Ê§ý Ñà¡mã Ñ¡ ñ

Show that the interference fringes formed in reflected and transmitted part due to thin film with monochromatic light are compementary to each other.

OR

tà¢§ýÌyÂà Íuâm§ýÊ½àtàqã §ýL yÊjÀàà ¥w¡ §ýàuâwâo ytlà¢¥ ñ ÐnàÂàã§ý¡m mnà w¡Ùàà§ýàÊ âÄýÂk¡ ŽààÅm §ýÊÂà¡ §ý âv¥ Íuâm§ýÊ½àtàqã §ýà¡ â§ýy ŽàS§ýàÊ ytâkm §ýÊm¡ Ñ¡ ?

Explain the construction and working of Michelson's interferometer. How is interferometer adjusted to obtain the localised and circular fringer.

ŽàÎÀà-4. *N* âÐv¹¡à¡ y¡ ÄýàÂàÑàÄýÊ âwwm¡Àà §ý âv¥ mãw¡mà âwmÊ½à §ýà Íu¡k§ý âÂàªàâtm §ýLâk¥ ñ £0°j™¡ ¥w¡ âÂàâÊÂà™¡ §ý âv¥ ¡àwÎu§ý Îàm¡ ŽààÅm §ýLâk¥ ñ

Obtain expression for the intensity distribution of Fraunhofer diffraction due to *N* slits obtain conditions for the principle maxima and minima.

OR

Äýrêã-q¡Êà Íuâm§ýÊ½àtàÊã §ýL âwsÀÂà Õàtmà §ý âv¥ Íu¡k§ý âÂàªàtâm §ýLâk¥ ñ

Derive an expression for resolving power of Febry-Perot interfeometer.

ŽàÎÀà-5. Žàrv £öãâwm £¾yk¡Àà §ý âv¥ ¡àwÎu§ý Îàm¡à §ýà £ÌvÞh §ýLâk¥ mnà ¢y yÀs¡ t¡ ¡à¢Ây¹¡àÂà §ý ªà½àà§ýà¡ *A* w *B* §ýL Íuà©uà §ýLâk¥ ñ

State the necessary conditions for the strong stimulated emission and in this reference explain the Einstein's coefficients A and B.

OR

Ñãâvu¡À-âÂà¡ à¡Âà vyÊ §ýL yÊjÀàà mnà §ýàu¡ âwâo ytlà¢¥ ñ Ñãâvut-âÂà¡ à¡Âà vyÊ y¡ ŽààÅm â§ýÊ½à q¡k §ýL À¡à âwÎà¡xmà¥ âvâh¥ ñ

Explain the construction and working of Helium-neon laser. Write two characteristics of the beam obtained from the Helium-neon laser.

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Annual Examination - 2017

B.Sc.-II

PHYSICS

Paper - II

WAVES, ACOUSTICS AND OPTICS

Max.Marks : 50

Time : 3 Hrs. **Min Marks : 17**

¹¡ãq ß h½»¡'¡'t¡ Ày ¡âmvi¡ÙàÊã ŽàÎÀà Ñ¡, âkÂÑ¡ Ñv §ýÊÂàà ¡âÂàwàu¡ Ñ¡ ñ h½»¡'r't¡ vi¡ÙàÊã ŽàÎÀà h½»¡'y't¡ À¡ã i¡ £ÙàÊãu ŽàÎÀà Ñ¡ ñ h½»¡'¡'§ýà¡ yry¡ qÑv¡ Ñv §ýÊ¡ ñ

Note : Section 'A' is objective type, containing 10 questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.

h½»¡-'¡'(Section-'A')

âÂàÈÂàà¡â§ým ¡âm vi¡£ÙàÊãu ŽàÎÀàà¡ §ý £ÙàÊ ¥§ý uà À¡à q¡âQýuà¡ t¡ À¡ ñ

(Answer the following very short-answer-type questions in one or two lines.) (1x10=10)

ŽàÎÀà-1. ytô §ýL ªàÑÊà¢¡ Âàà¡qÀà¡ t¡ §ýà¡Âà yã mÊªà £quà¡ªà §ýL kàmã Ñ¡ -

Which wave is used for the measurement of depth of sea.

ŽàÎÀà-2. Žàªàà¡tã mÊªà §ýà¡ qáÊsâàxm §ýLâk¥ ñ

Define progressive wave.

ŽàÎÀà-3. Ñà¢ªà¡Âà Âàâ¡Ø¡à§ýà mnà ÊÈy»¡Âà Âà¡à¡Ø¡à§ýà t¡ ¥§ý ¡¡mÊ âvâh¥ ñ

Write down one difference between Huygen's and Ramsden's eyepiece.

ŽàÎÀà-4. ¥§ý w½àJu âwqn¡Âà §ýà¡ qáÊsàâxm §ýLâk¥ ñ

Define monochromatic aberrations.

ŽàÎÀà-5. Íuâm§ýÊ½à §ýà¡ qáÊsâàxm §ýLâk¥ ñ

Define interference.

ŽàÎÀà-6. ¹¡àvàÂÐ§ýL âÄýÂk¡à §ýà¡ qáÊsàâxm §ýLâk¥ ñ

Define Tolansky fringes.

P.T.O.

ZàÎÀà-7. ÀÉÀÎàJ §ýL âwsÀÂà Õàtmà §ýà yØà âvâh¥ ñ
Write formula for resolving power of telescope.

ZàÎÀà-8. ÄïýÂàv âwwmÂà §ýà qáÊsàâxm §ýLâk¥ ñ
Define Fresnel's diffraction.

ZàÎÀà-9. vïyÊ §ýà qáÊsàâxm §ýLâk¥ ñ
Define LASER.

ZàÎÀà-10. Úrã vïyÊ §ýà mÊªàÀÁu¡ âvâh¥ ñ
Write wave length of Ruby-Laser.

h½»¦-'r'(Section-'B')

âÂàÈÂàà¡â§ým vi¦ £ÙàÊãu ZàÎÀàà¡ §ý £ÙàÊ 150-200 Îà£À-yãtà t¦ À¦ ñ
(Answer the following short-answer type questions with word limit 150-200) **(3x5=15)**

ZàÎÀà-1. §ývà w¤ª à mnà ytÑ w¤ª à §ýà ytlà¢¥ ñ
Explain phase velocity and group velocity.

OR

$5.5x10^3$ â§ý¤ªàà/tã¹¦Ê³ iÂà¾w §ýL¥§ý oàm¡ t¦ 400 §ýÈqÂà/y§ý½»¦ ¡àwâÙà §ýL ¡ÀàÀÁu¡ mÊªàà¡ §ýL mÊªàÀÁu¡ Öààm §ýLâk¥ ñ oàm¡ §ýà u¤ª à Zà¾uàÐnmà ª à½àà§ý $Y = 8.8x10^{10}$ Âu¡¹¦Âà/tã¹¦Ê³ ñ
Find the wavelength of longitudinal waves of frequency 400 Hz in a metal of density $5.5x10^3$ kg/m³. The Young's modulus of metal is $Y = 8.8x10^{10}\ N/m^3$

ZàÎÀà-2. Äýt¹¦ §ýà ây÷àm ytlà¢¥ ñ
State Fermat's principle.

OR

uâÀ ÊÈy»¦Âà Âàâ Øà§ýà §ýL yuQý ÄýàSýy ÀÊã 6 y¡.tã. Ñ¡ mà ¢y§ý ¡wuwã vïyà §ýL ÄýàSýy ÀÊã mnà £Âà§ý rãj §ýL ÀÊã Öààm §ýLâk¥ ñ
If the combined focal length of Ramsden's eyepiece is 6 cm, then find the focal length of his component lenses and distance between them.

ZàÎÀà-3. Ñà»¦ÂkÊ §ýL âÄýÂk¡ ¡nwà ytàÀà lSýàw §ýL âÄýÂk¡ §ýà ytlà¢¥ ñ
State Haidinger's Fringes or Fringes of equal inclination.

OR

Àà¡ mÊª àà¡ §ýL mâwïmà ¡à¦ §ýà ¡ÂàqàmÌ 1ß9 Ñ¡ ñ uâÀ u¡ ÀàÂàà¡ mÊª à¡ ÍuâmSýÉ½à SýÊmã Ña¡ mà¡ tÑÙàt mnà ÂuÂàmt yÈsw mãwïmà ¡à¦ §ýà ¡ÂàqàmÌ Öààm §ýLâk¥ ñ
The ratio of intensities of two waves is 1:9. If the two waves interfere, find the ratio of maximum and minimum intensities.

ZàÎÀà-4. kàÂà Åv¹¦ ¨uà Ñ¡ ? uÑ âSýy ZàSýàÊ rÀàâuã kàmã Ñ¡ ?
What is a zone plate? How it is constructed?

OR

âõ-¡qwmÂà y¡ ¡àq ¨uà ytlm¡ Ñ¡ ?
What do you understand by double refraction.

ZàÎÀà-5. kÂày©uà Íu¾§ýt½à ¨uà Ñ¡ ?
What is population inversion.

OR

6600 Å mÊª àÀÁu¡ §ý ZàSýàÎà §ýL 20 mÊª àà¡ §ý âv¥ §ývà yÈr÷ vÈrà¢¡ mnà §ývà yÈr÷ ytu Öààm §ýLâk¥ ñ
Calculate the coherence length and coherence time for 20 waves of light whose wavelength is 6600 Å.

h½»¦-'y'(Section-'C')

âÂàÈÂàà¡â§ým Àãi¦ £ÙàÊãu ZàÎÀàà¡ §ý £ÙàÊ 300-350 Îà£À-yãtà t¦ À¦ ñ
(Answer the following long-answer type questions with word limit 300-350) **(5x5=25)**

ZàÎÀà-1. ¥§ý ytàÂà mÂàã Ñ¡¢ »¦àÊã t¦ ¡ÀàZàÐn mÊª à §ý w¤ª à §ý âv¥ Íuïk§ý âÂàª àât m §ýLâk¥ ñ
Derive an expression for velocity of transverse waves in uniform stretched string.

OR

ÁwâÂà mÊª àà¡ §ýà qÊàwmÂà, ¡qwmÂà mnà âwwmÂà ytlà¢¥ ñ ÁwâÂà qÊàwmÂà §ý £quà¤ª à âvâh¥ ñ
Explain reflection, refraction and diffraction of sound waves. Write uses of reflection of sound.

ZàÎÀà-2. ¥§ý tà¹¦ vïy §ýL ÄýàSýy ÀÊã §ýà Íuïk§ý ZàaÅm §ýLâk¥ ñ
Derive an expression for the focal length of a thick lens.

P.T.O.