Assignment no.2

GA-II (III Semester) MM:30

Attempt all questions. All carry equal marks.

Multiple choice questions

1. In young's experiment, the intensity at the central fringe is I. when one of the slit is closed, the intensity at that point become I_0. they are related as
    a. $I = I_0$
    b. $I = 2\ I_0$
    c. $I = 4\ I_0$
    d. No relation
2. In Newton's ring experiment, it is essential that
    a. the white light from a narrow slit falls normally on the film
    b. the light from an extended source is incident normally on the film
    c. the white light falls normally on the film
    d. there must be only air and no other medium in between the lens and the plane glass plate.
3. An Oil floating on the surface of water appears colored in white light. the expected thickness of the film is
    a. $100A^0$
    b. $10000A^0$
    c. 1mm
    d. 1cm
4. In Newton's ring experiment , circular rings are formed
    a. by division of amplitude
    b. by division of wavelength
    c. by diffraction
    d. by polarization
5. In Newton's ring experiment, the expression for the measurement of wavelength is
    a. $\lambda= D^2_{n+p} - D^2_n/4R$
    b. $\lambda= D^2_{n+p} - D^2_n/4pR$
    c. $\lambda= D^2_{n+p} - D^2_n*4pR$
    d. $\lambda= 4R/ D^2_{n+p} - D^2_n$
6. The condition of the destructive interference in the reflected part of light from a plate is
    a. $2\mu t\cos r = (2n + 1) \lambda/2$,
    b. $2\mu t\cos r = (2n - 1) \lambda/2$
    c. $2\mu t\cos r = n \lambda$
    d. none
7. In Michelson's interferometer , the fringes are formed
    a. circular at infinity
    b. circular in the film in between the mirrors
    c. straight and localized
    d. of any shape and localized
8. The essential condition for fraunhoffer's class of diffraction is that
    a. the incident wave front must be the plane
    b. the incident wave front must be the spherical

c. both the incident and diffracted wave front must be plane
d. all of the above

9. The expression for the area of a half period zone is
   a. $\pi b/\lambda$
   b. $\lambda /\pi b$
   c. $\pi b\lambda$
   d. $2\pi b\lambda$
10. The centre of the image of a narrow circular disc illuminated from one side is
    a. completely dark
    b. bright
    c. the bright or dark depending on its distance
    d. nothing can be said
11. Diffraction of light is observed when the size of the obstacle is
    a. very large
    b. very small
    c. howsoever large or small
    d. comparable with the wavelength of light
12. The fundamental focal length for a zone plate is more for the
    a. red color
    b. violet color
    c. green color
    d. yellow color
13. The radius of half period zones are proportional to
    a. $1/\sqrt{n}$
    b. $\sqrt{n}$
    c. $n^{-3/2}$
    d. $n^{3/2}$
14. The difference in the average distance of a point from the two consecutive half period zones on the plane wave front corresponding to that point of observation is
    a. $\lambda/2$
    b. λ
    c. $\lambda/4$
    d. 2λ
15. If the radius of the first circle on a zone plate is r, it behaves like a convex lens for the light of wavelength λ whose multiple focal lengths are
    a. r^2/λ, $2r^2/\lambda$, $3r^2/\lambda$……….
    b. r^2/λ, $r^2/3\lambda$, $r^2/5\lambda$………..
    c. r^2/λ, $r^2/2\lambda$, $r^2/3\lambda$ ………
    d. λ/r^2, $\lambda/3r^{2}$, $\lambda/5r^2$ ……….
16. The condition of maxima in diffraction due to a single slit is
    a. p = 0,π,2 π,3 π…..
    b. p = 0, 3/2 π,5/2 π,7/2 π……
    c. p = 0,1/2 π, π,3/2 π……..
    d. p = 1/2 π,3/2 π,5/2 π…….
17. The condition of minima in the diffraction due to a single slit is
    a. $e\sin\theta = n\lambda$

b. $ne\sin\theta = \lambda$
c. $e\sin\theta = 1/n\,\lambda$
d. $(e+d)\sin\theta = n\,\lambda$

18. The total angular width of central maxima in the diffraction pattern due to single slit is
    a. λ/a
    b. $2a/\lambda$
    c. $2a/3\lambda$
    d. $2\sin^{-1}\lambda/a$
19. In a plane grating the width of the slit is equal to the width of its opaque part, the missing spectrum will be
    a. first order
    b. second order
    c. third order
    d. first & second order
20. For normal incidence on a grating , the condition of principal maxima is
    a. $e\sin\theta = n\,\lambda$
    b. $a\sin\theta = n\,\lambda$
    c. $e\sin\theta = (2n+1)\lambda/2$
    d. $e = a\sin\theta$
21. The expression for the resolving power of a grating is
    a. $\lambda/d\lambda = Nn$
    b. $d\lambda/\lambda = nN$
    c. $d\lambda/\lambda = t\, d\mu/d\lambda$
    d. none
22. For the resolution of two spectral lines of same intensities I_0 , the intensity at the dip in the middle of their central maxima in the resultant intensity distribution must be
    a. I_0
    b. slightly less than I_0
    c. slightly more than I_0
    d. $0.81\, I_0$ or less than it
23. The angular separation between the central maxima in the images of two objects is Φ and the half angular width of either of the central maxima is θ . the two images are said to be just resolved when
    a. $\Phi<\theta$
    b. $\Phi>\theta$
    c. $\Phi=\theta$
    d. none
24. The resolving power of a grating can be increased
    a. by increasing the order of the spectrum
    b. by increasing the no of lines on the grating
    c. by increasing both
    d. by increasing the ruled width of the grating
25. Maximum resolving power of a grating is
    a. Wn/e
    b. $W\lambda/e$
    c. W/λ
    d. nN

26. Which statement is more correct
    a. the light waves are electromagnetic waves
    b. light waves are the electromagnetic transverse waves with vibrations in all possible directions in a plane perpendicular to the direction of the propagation of light
    c. polarized light waves have the property of symmetry about the direction of propagation of the light
    d. sound waves in air can be polarized
27. The angle between the plane of vibration and the plane of polarization of a polarized light is
    a. 0^0
    b. 90^0
    c. 180^0
    d. 45^0
28. The phenomenon not exhibited by sound waves is
    a. Diffraction
    b. Polarization
    c. Interference
    d. beats
29. The incorrect statement regarding the ordinary and extraordinary wave
    a. in a uniaxial crystal is both travel with different speed in all directions except along optic axes
    b. both are plane polarized
    c. both have spherical wave fronts
    d. both have their plane of polarization mutually perpendicular to each other
30. In an uniaxial positive crystal
    a. $\mu_o=\mu$
    b. ,$\mu_o>\mu_e$
    c. $\mu_o<\mu_e$
    d. $\mu_o=2\mu_e$
31. An uniaxial double refracting crystal is
    a. Calcite
    b. Topaz
    c. Aragonite
    d. all of the above
32. Polaroids are constructed from
    a. calcite crystal
    b. quartz crystal
    c. tourmaline crystal
    d. iodosulphate of quinine
33. In a nicol prism, at the Canada balsum layer
    a. O-ray trvels from denser to rarer medium
    b. E- ray travel from denser to rarer medium
    c. O-ray does not suffer total internal reflection
    d. E-ray suffers total internal reflection
34. The refractive index of O &E-rays are respectively
    a. 1.658, 1.486
    b. 1.486,1.658

c. 1.550,1.330
d. 1.330,1.550

35. The half wave plate produces a phase difference between the O & E ray is equal to
    a. Π
    b. $\pi/2$
    c. $\pi/4$
    d. $3\pi/2$
36. The thickness of half wave plate is given as
    a. $t=2/\lambda(\mu_o-\mu_e)$
    b. $t=4/\lambda(\mu_o-\mu_e)$
    c. $t=\lambda/2(\mu_o-\mu_e)$
    d. $t=\lambda/4(\mu_o-\mu_e)$
37. A plane polarized light is incident normally on a quarter wave plate and the plane of polarization makes an angle 45^0 with the optic axis. The emergent light is
    a. circularly polarized
    b. elliptically polarized
    c. plane polarized
    d. unpolarised
38. A light beam when passed through a rotating nicol, there is no variation in the intensity of emergent light, the light beam is
    a. circularly polarized
    b. elliptically polarized
    c. plane polarized
    d. unpolarised
39. Brewster's law can be expressed as
    a. μ= tan r
    b. μ=1/tan r
    c. μ = tan I
    d. tani = 1/μ
40. A zone plate has
    a. a single focus
    b. two foci
    c. no focus
    d. multiple foci
41. The bending of light at the corners of an obstacle is called as
    a. Interference
    b. Diffraction
    c. Scattering
    d. dispersion
42. In an interference pattern, points of minimum intensity are perfectly dark but in the diffraction pattern the point of minimum intensity are also
    a. perfectly dark
    b. not perfectly dark
    c. uniformly distributed intensity
    d. none of the above
43. The central fringe in fresnel's biprism is

a. Bright
b. Dark
c. first bright then dark
d. first dark then bright

44. Two coherent sources of light will produce constructive interference when the phase difference between them is
    a. Π
    b. 2π
    c. 3/2π
    d. 1/2π
45. In Newton's ring experiment the diameter of the rings are proportional to
    a. λ
    b. λ^2
    c. √λ
    d. 1/√λ
46. Law of malus is
    a. $I = I \cos^2\theta$
    b. $I = I \cos\theta$
    c. $I = I \sin^2\theta$
    d. $I = I \sin\theta$
47. Two light beam of intensities I and 4I produce interference. The maximum and minimum possible intensities of the resultant beam will be
    a. 5I , 3I
    b. 5I , I
    c. 9I , I
    d. 9I , 3I
48. A grating has 15000 lines per inch , the grating element will be in cm
    a. $1.693*10^{-4}$
    b. $1.693*10^{-5}$
    c. $1.693*10^{-6}$
    d. $1.693*10^{-7}$
49. A grating has 7000 lines per cm. for normal incidence of a parallel beam of light of wavelength $5000A^0$, the maximum no of order seen are
    a. 1
    b. 3
    c. 2
    d. 2.857
50. A ray of light is incident on the surface of a glass plate of refractive index1.55 at the polarizing angle, the angle of refraction is
    a. 0^0
    b. 57^0
    c. 32^0
    d. 157^0

Answer sheet for Assignment no.2

Name……………………………….. **do not over write, write answer clearly**

Roll no………………………………..

1		11		21		31		41	
2		12		22		32		42	
3		13		23		33		43	
4		14		24		34		44	
5		15		25		35		45	
6		16		26		36		46	
7		17		27		37		47	
8		18		28		38		48	
9		19		29		39		49	
10		20		30		40		50	

Maximum marks: 50 **Marks obtained:……………………..**

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6		16		26		36		46	
7		17		27		37		47	
8		18		28		38		48	
9		19		29		39		49	
10		20		30		40		50	

Maximum marks: 50 **Marks obtained:…………………….**