

2/1 and 2/2 Lab Related
Question bank.



PABNA UNIVERSITY OF SCIENCE & TECHNOLOGY, PABNA.

Answer Script of Class Test



SL No. 557845

Name of the Exam: Year Semester Exam.20

Name of the Department

Roll No. Registration No.

Session Course code Course title

Date of Exam

Invigilator

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Resolving power of grating

SA-1
TK-8

1. What is the resolving power?
2. Why is grating used?
3. What is grating?
4. What is diffraction grating?
5. What are the conditions of diffraction?
6. What is diffraction? Classification of diffraction.
7. What is interference? Classification of interference.
8. What are the applications of diffraction grating?
Commonly used in monochromators, spectrometers, lasers, wavelength division multiplexing devices, optical pulse compression devices and many other optical instruments. CDs and DVDs are good, easily observable examples of diffraction grating.
9. What is the SI unit of resolving power?
It is the mean ratio of mean wavelength of a pair of spectral lines and the difference of wavelength betⁿ them. So it has no unit.

$$R = \frac{\lambda}{\Delta\lambda} = nN$$

10. What type of diffraction occurs in diffraction grating? Fresnel diffraction
11. How many lines are there in grating?
A diffraction grating 1 cm wide has 1200 lines and is used in second order.
12. What is the principle of grating?

A diffraction grating is able to disperse a beam of various wavelengths into a spectrum of associated lines because of the principle of diffraction: in any particular direction, only those waves of a given wavelength will be conserved, all the rest being destroyed because of interference with one another.

13. Why grating is called super prism?

14. Common question for everyone: Theory of light or nature of light. The limitations and overcome
1. Corpuscular Theory or particle theory of light.
 2. Wave theory

3. Electromagnetic theory

4. Quantum theory.

5. What is grating made up?

Grating ^{can be} made of materials such as steel, aluminum, fiberglass.

16. Which is better diffraction grating or prism?

17. How is diffraction used in real life?

Real-life examples of diffraction are: Red color that is seen during the sunset is caused by the diffraction of light. Bending of light at the corners of the door or window.

18. Who made the grating first? In 1785 by David Rittenhouse

19. What is the relation betⁿ diffraction and wavelength?

The amount of diffraction (the sharpness of the bending) increases with wavelength and decreases with decreasing wavelength.

In fact, when the wavelength of the wave/light is smaller than the obstacle, no noticeable diffraction occurs.

20. What is grating pitch?

A ^{diffraction} grating consists of a large number of regularly spaced grooves on a substrate. The distance betⁿ adjacent grooves is called the pitch.

21. How is grating prepared?

A diffraction grating is made by making many parallel scratches on the surface of a flat piece of transparent material. It is possible to put a large number of scratches per cm on the material, e.g., the grating to be used has 6000 lines/cm on it.

22. What ^{are} the conditions of interference and diffraction?

* Interference: (1) The sources of the waves must be coherent, which means that they emit identical waves with a

constant phase difference.

2. The waves should be monochromatic - they should be of a single wavelength.
3. The sources must be small enough that it can be considered as a point source of light.
4. The sources must emit light in the same state of polarization.

• Diffraction → ① The condition of diffraction is that, the width of the obstacle must be less than or comparable with the wavelength of the wave. The greater the wavelength of the wave higher will be its degree of diffraction.

23. What is optics?

Optics is a branch of physics which is concerned with light and its behavioral patterns and properties. Optics is a branch of physics that deals with the determination of behavior and the properties of light, along with its interactions with matter and also with the instruments which are used

to detect it.

24. What is prism in science?

Prism in optics, a piece of glass or other transparent material cut with precise angles and plane faces, useful for analyzing and reflecting light. An ordinary triangular prism can separate white light into its constituent colors, called a spectrum.

Prism is a ~~3D~~ three dimensional (3D) solid object in which the two ends are identical.

25. How many plane is present in prism?

26. What types of materials are used for producing prism?

27. Why light is bent when it is entering into prism?

28. ~~Why~~ why spectrum is formed when light is passing through a prism?

29. If we used normal glass against prism then what will be happened?

30. Is water drop acts as a prism?



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SL No.557842...

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Invigilator

31. In a spectra or in a spectrum of light we have seen seven color, at first red, black --- and so on.
What is the factor depend about this matter?
32. Why the we have seen the red colour in sun set and sun raise moment?
33. Why the sky is blue? Explain or give your answer / opinion about it.

Conductivity of a bad conductor

- * 1. What do you mean by conductor and bad conductor?
2. What are the basic differences among conductor, semiconductor, insulator and superconductor. Give examples.
3. What are the types of semiconductors?
4. Mention some applications of bad conductor, conductor, semiconductor, and ~~super~~
5. Among the above mentioned conductor, which is the best one and why? Explain.
6. What is band gap? What are valence band and conduction band?
7. What ~~is~~ ^{are} Fermi level and Fermi energy?
8. What are ~~the~~ conductivity, thermal conductivity and electrical conductivity?

Thermocouple and Thermoelectric power

1. What is couple and what is thermocouple?
2. Which materials are used ~~to~~ in thermocouple?
3. What ~~is~~ happened in ~~a~~ when the two ends of the thermocouple is placed at different temperature
OR

Explain the basic mechanism or principle of thermocouple.

4. Which effect is related to thermocouple?
- * 5. What are Seebeck, Peltier and Thomson Effects?
6. What are thermal e.m.f and thermoelectric power?
7. What is thermoelectricity?
8. What is thermoelectric effect? It is the direct conversion of ~~the~~ temperature differences to electric voltage and vice versa via a thermocouple.
9. What is the application of thermocouple?
To furnace monitoring and control, to food and beverage processing, to automotive sensors, to aircraft engines, to rockets, satellites and spacecraft.

10. Why is thermocouple used?

A thermocouple is a device for measuring temperature. It comprises two dissimilar metallic wires joined together to form a junction. When the junction is heated or cooled, a small voltage is generated in the electrical circuit of the thermocouple which can be measured and this corresponds to temperature.

11. What is the temp. range of thermocouple?
 -200°C to 350°C (-330°F to 660°F)

12. What are the types of thermocouple?

* There are eight types of thermocouple.

- (i) B-type thermocouple:
- (ii) E - " "
- (iii) J - type " iron/constantan.
- (iv) K - type " Cr/Al
- (v) N - type "
- (vi) R - type "
- (vii) S - " "
- (viii) T - type " Cu/constantan

13. Why do thermocouples have two metals?

The Peltier effect states that two dissimilar metals in the junctions can generate an electromotive force due to the differing temperatures of the junctions and the Thomson effect states that two unlike metals in these junctions can generate a potential due to the temp. gradient along the length of the circuit.

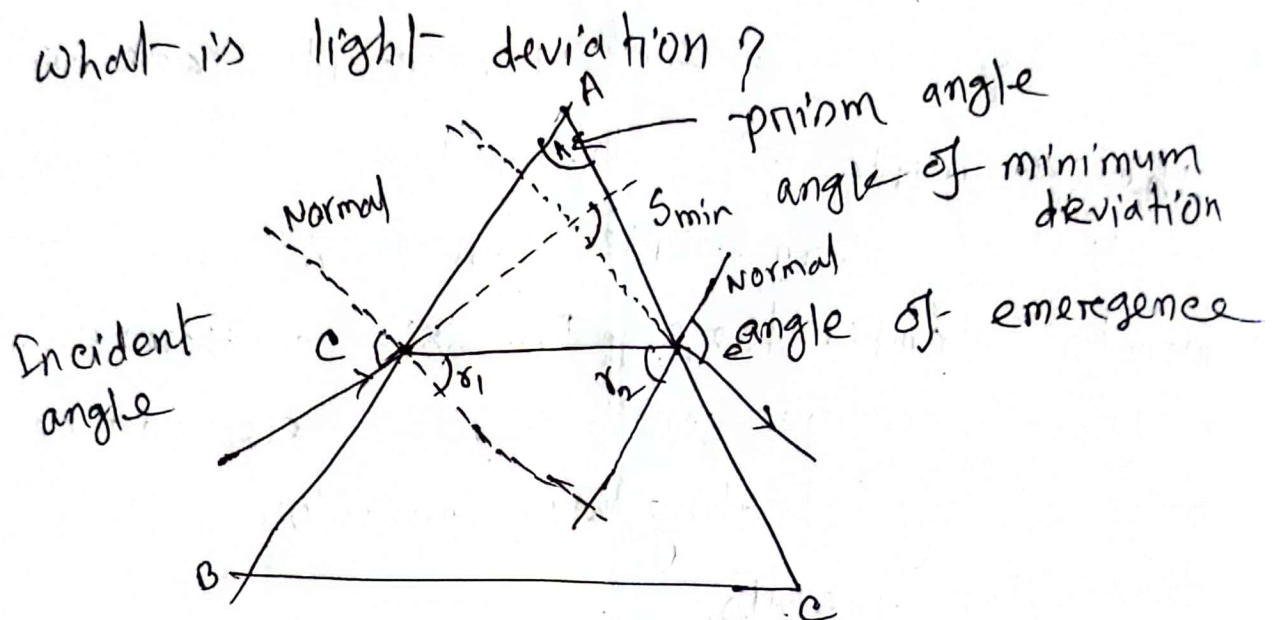
14. Is thermoelectric and thermocouple are same?

The principle of a thermoelectric generator is same as that of thermocouple, which is commonly used to monitor temperature. In both a thermocouple and a thermoelectric generator, the electricity is produced by heating the junction between two dissimilar metals.

* Thermoelectric thermometer is a temperature-measuring device consisting of two wires of different metals joined at each end. One junction is placed where the temperature is to be measured, and the other is kept at a constant lower temperature.

Refractive Index of Prism

1. What is prism?
2. What is prism formula?
3. Is angle of a prism is 60 degree?
4. What is the minimum deviation of for prism?
5. What is angular deviation?
6. What is light deviation?



The angle of deviation is defined as the angle which is obtained from the difference between the angle of incidence and the angle of refraction created by the ray of light travelling from one medium to another that has different refractive index.

7. What is refractive index? mention the formula of it.
8. What do you mean by the refractive index of water is 1.33 or ^{for} the glass 1.66?
9. What happened ~~when~~ when light is incident on a metal surface or on a material?
10. Mention the three phenomena when light is incident on a metal surface, or on a material.
11. What is spectrum? who discovered the scattering phenomena of light?
12. What is scattering?
13. What is the relation betⁿ the scattering of light and the wavelength?
14. Mention different types of scattering.

monochromatic

- * 1. What do you mean by coherent source?
- * 2. How Newton's rings are formed?
- * 3. Why you used coherent source for producing Newton's ring?
- * 4. Is it possible to form Newton's ring by using complex light?
- * 5. If possible, then what the shape of Newton's ring?
- * 6. Why the central part of Newton's ring is dark?
- * 7. Is it possible, the central part is bright?
- * 8. If possible, how it is? Explain.
- * 9. Where the Newton's rings are formed?
- * 10. What is interference? What is the condition of interference? Classification of interference
- * 11. What is Bragg's law of diffraction?

2. Determination of wavelength by plane Diffraction Grating.

- *1. What is grating? ~~classify it.~~ Material
- *2. What is diffraction? what ^{are the} conditions of diffraction.
- *3. Which parameter of light is related with diffraction?
- *4. What is interference? classification of interference. Condition of interference. $2d \sin \theta = n\lambda$
- *5. What is scattering? Who discover it? Explain the scattering mechanism with wavelength.
- *6. What ^{are} ~~is~~ wavelength, frequency, time period?
- *7. What is prism? How many planes are available in a prism.
- *8. What material is used to manufacture of a prism?
- *9. What is refractive index? $n = \frac{c}{v}$
- *10. What is d-spacing / Interplanar spacing?
- * How Newton's rings are formed? $r \propto \frac{1}{\lambda^4}$
- * the coherent source?