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PAPER 201 QUESTION BANK

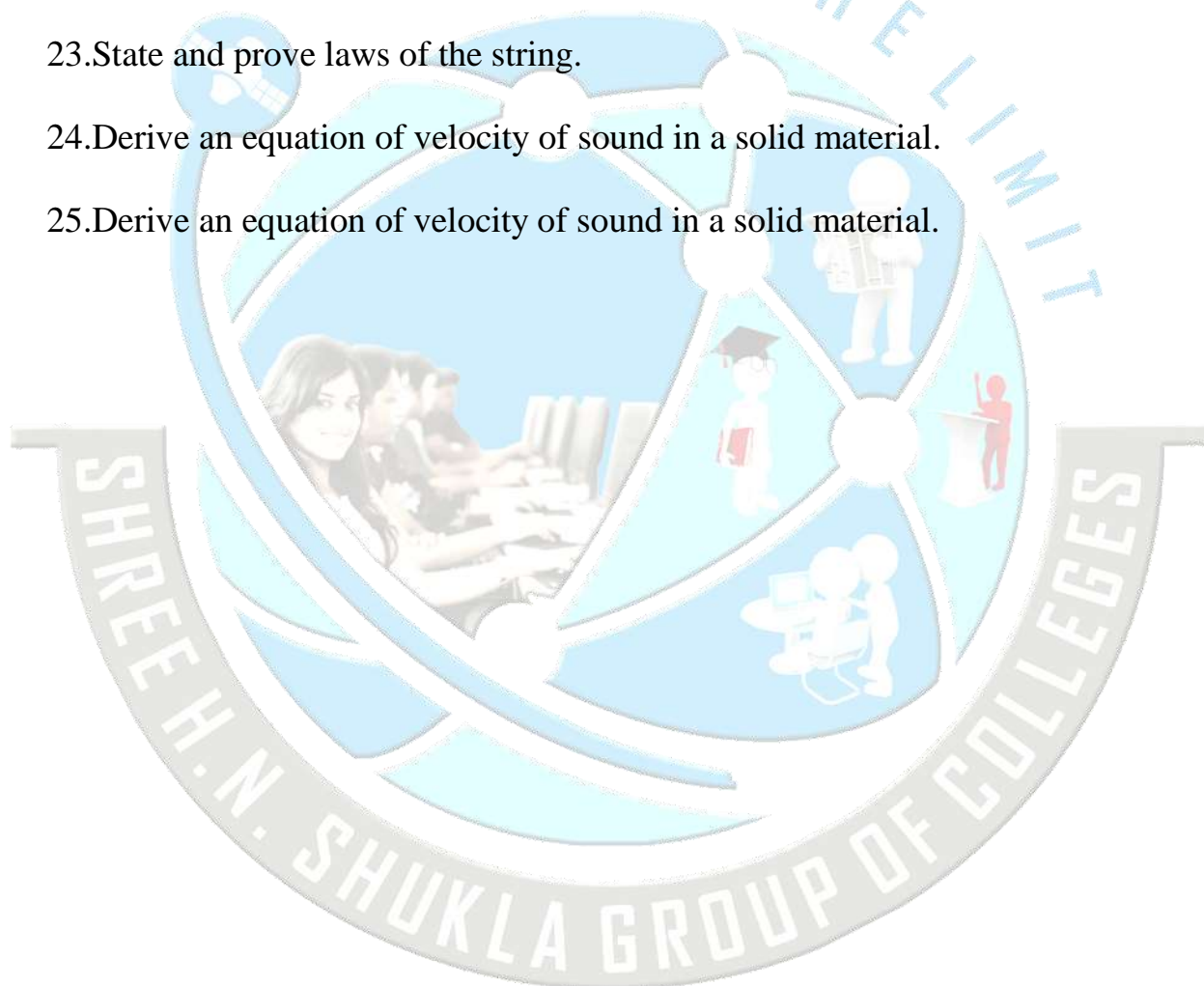
Unit: 1 Wave Motion and Waves in a String & Sound

1. What is longitudinal wave motion?
2. What is transverse wave motion?
3. State principle of superposition.
4. What are stationary waves?
5. _____ wave carry sound in air.
6. _____ phenomena cannot take place with sound.
7. Two waves of equal amplitude A and equal frequency travel in same direction in a medium the amplitude of the resultant wave is _____
8. Write the formula to find the velocity of sound in solid.
9. State the law of length of vibrating string.
10. State law of mass of the string.
11. State law of length of the string.
12. What are beats?
13. Define Doppler effect
14. Explain wave motion.
15. Explain transverse wave travelling on a string
16. Derive an expression of velocity of transverse wave on a string.
17. Explain interference.

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18. Explain normal modes of the string.
19. Verify the laws of the string.
20. Derive Newton's formula for velocity of sound in air.
21. Explain Laplace correction.
22. Explain acoustics in buildings.
23. State and prove laws of the string.
24. Derive an equation of velocity of sound in a solid material.
25. Derive an equation of velocity of sound in a solid material.



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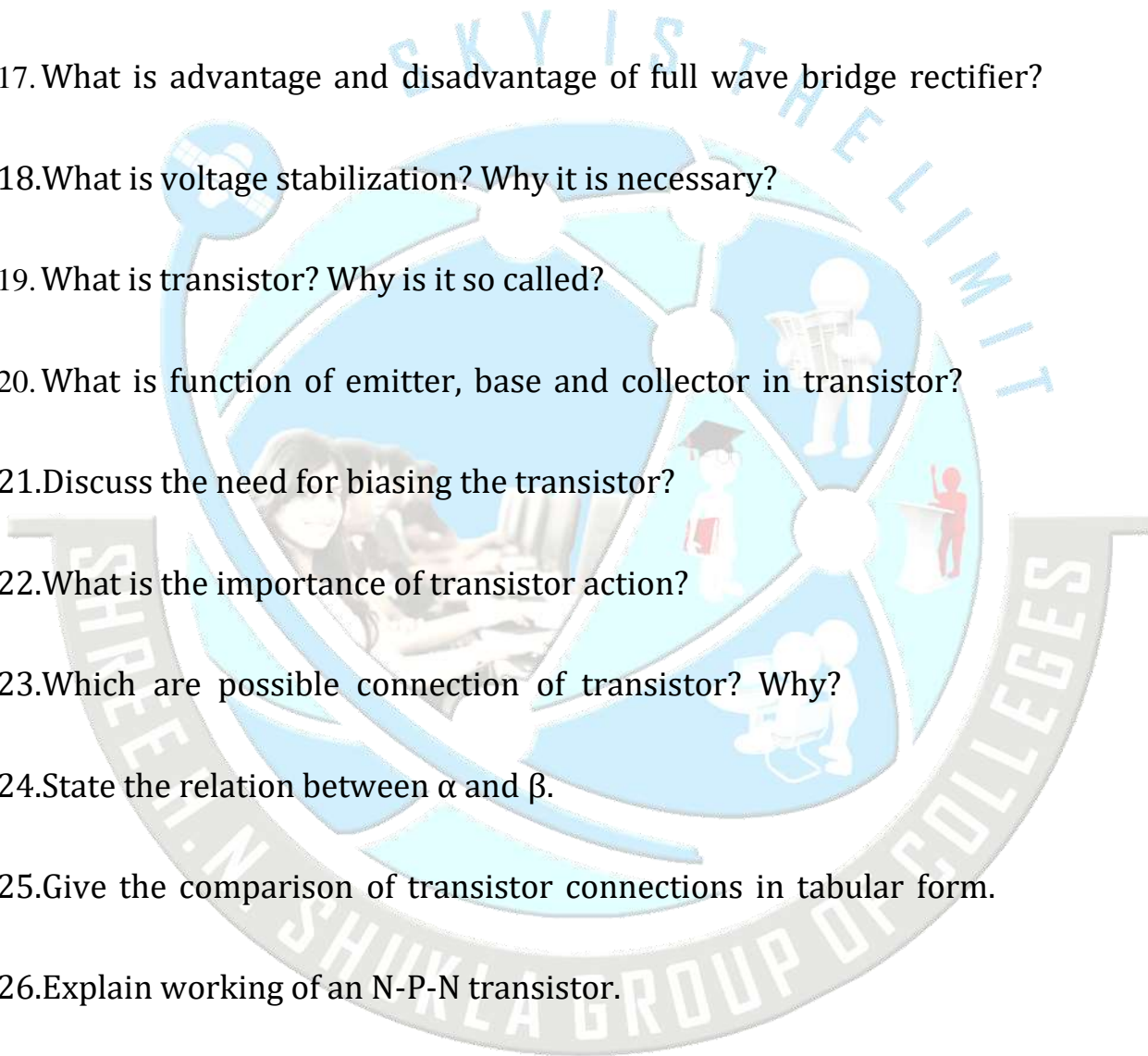
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Unit: 2 Semiconductor Diode and Transistors

1. The forward characteristics is not a straight line hence semiconductor diode is a non-linear conductor. (True of False)
2. What is cut-in/threshold voltage of the diode?
3. What is break-down voltage of PN-Junction diode?
4. For a half wave rectifier, _____ condition is satisfies for the ripple factor >
5. The capacitive reactance for d. c. is _____
6. The inductive reactance for a. c. is _____
7. What is voltage stabilization?
8. What is the use of filter circuit in rectifier?
9. Define input resistance of the transistor in C-B mode.
10. Define output resistance of the transistor in C-B mode.
11. Define input resistance of the transistor in C-E mode.
12. Explain PN-junction diode as a rectifier.
13. Explain half wave rectifier.

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14. What do you mean by ripple factor? Define formula of ripple factor.
 15. What do you mean by peak inverse voltage (PIV) of diode?
 16. What are the disadvantages of a half wave rectifier?
 17. What is advantage and disadvantage of full wave bridge rectifier?
 18. What is voltage stabilization? Why it is necessary?
 19. What is transistor? Why is it so called?
 20. What is function of emitter, base and collector in transistor?
 21. Discuss the need for biasing the transistor?
 22. What is the importance of transistor action?
 23. Which are possible connection of transistor? Why?
 24. State the relation between α and β .
 25. Give the comparison of transistor connections in tabular form.
 26. Explain working of an N-P-N transistor.
 27. Explain working of a P-N-P transistor.
 28. Explain input characteristics of CB transistor connection.
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29. Explain output characteristics of CB transistor connection.

30. Give mathematical analysis of a full wave rectifier regarding.

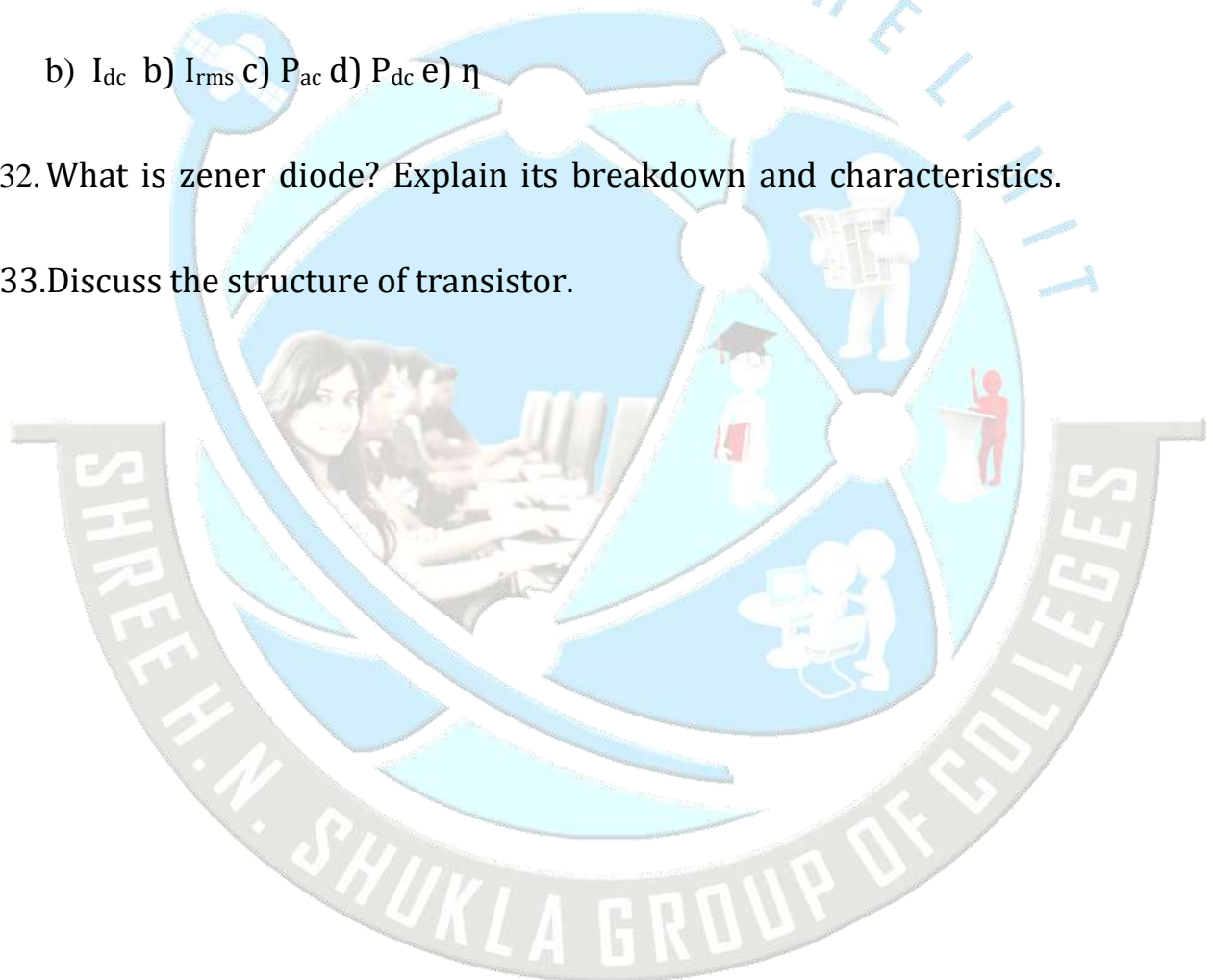
a) I_{dc} b) I_{rms} c) P_{ac} d) P_{dc} e) η

31. Give mathematical analysis of a half wave rectifier regarding.

b) I_{dc} b) I_{rms} c) P_{ac} d) P_{dc} e) η

32. What is zener diode? Explain its breakdown and characteristics.

33. Discuss the structure of transistor.



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34. Drive the 1) $I_C = \alpha I_E + I_{CBO}$ 2) $I_C = \beta I_B + I_{CEO}$ 3) $I_C = (\beta + 1) I_B + (\beta + 1) I_{CBO}$.

35. Explain the construction and working of choke input filter.

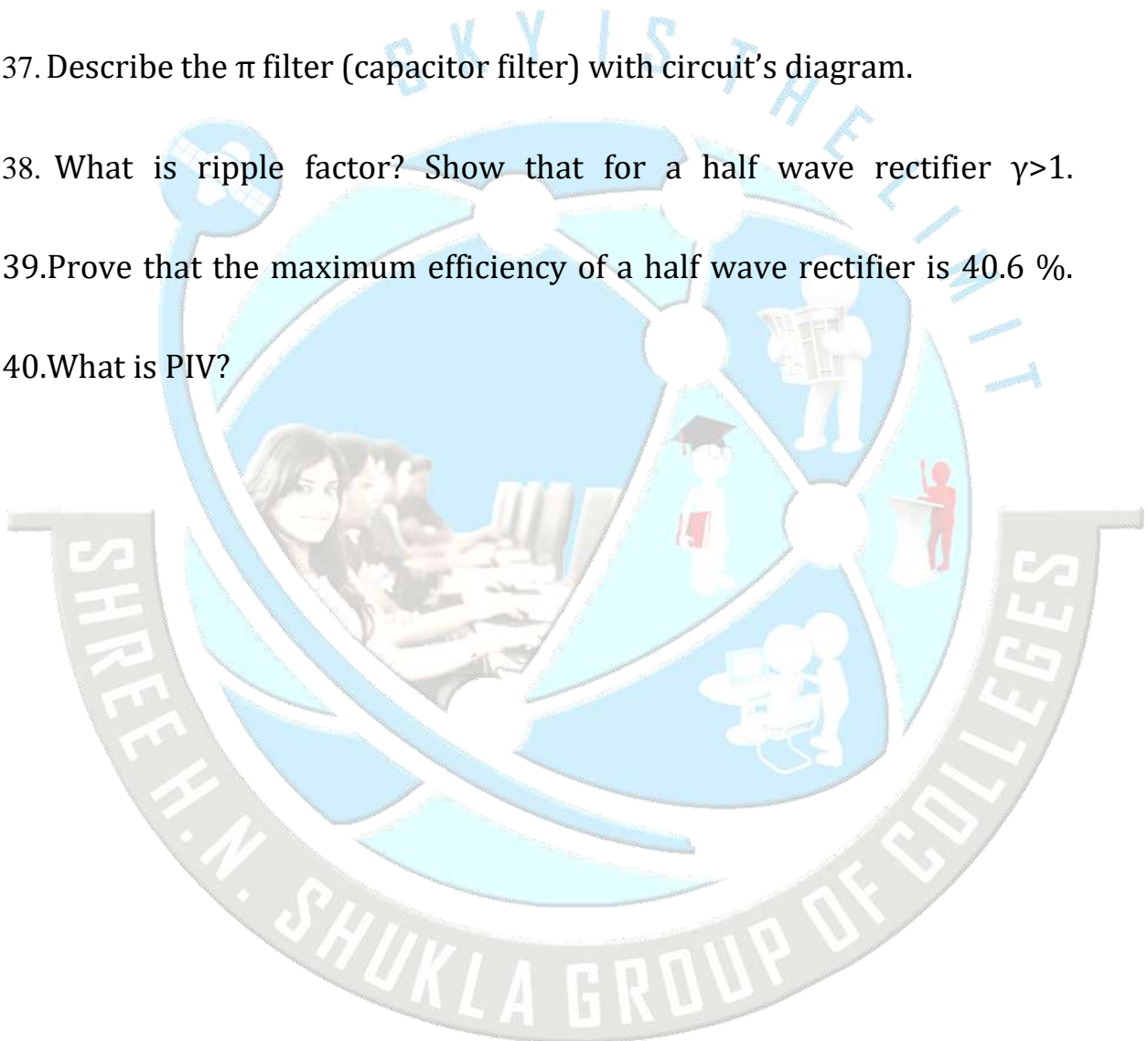
36. Explain the construction and working of capacitor filter.

37. Describe the π filter (capacitor filter) with circuit's diagram.

38. What is ripple factor? Show that for a half wave rectifier $\gamma > 1$.

39. Prove that the maximum efficiency of a half wave rectifier is 40.6 %.

40. What is PIV?



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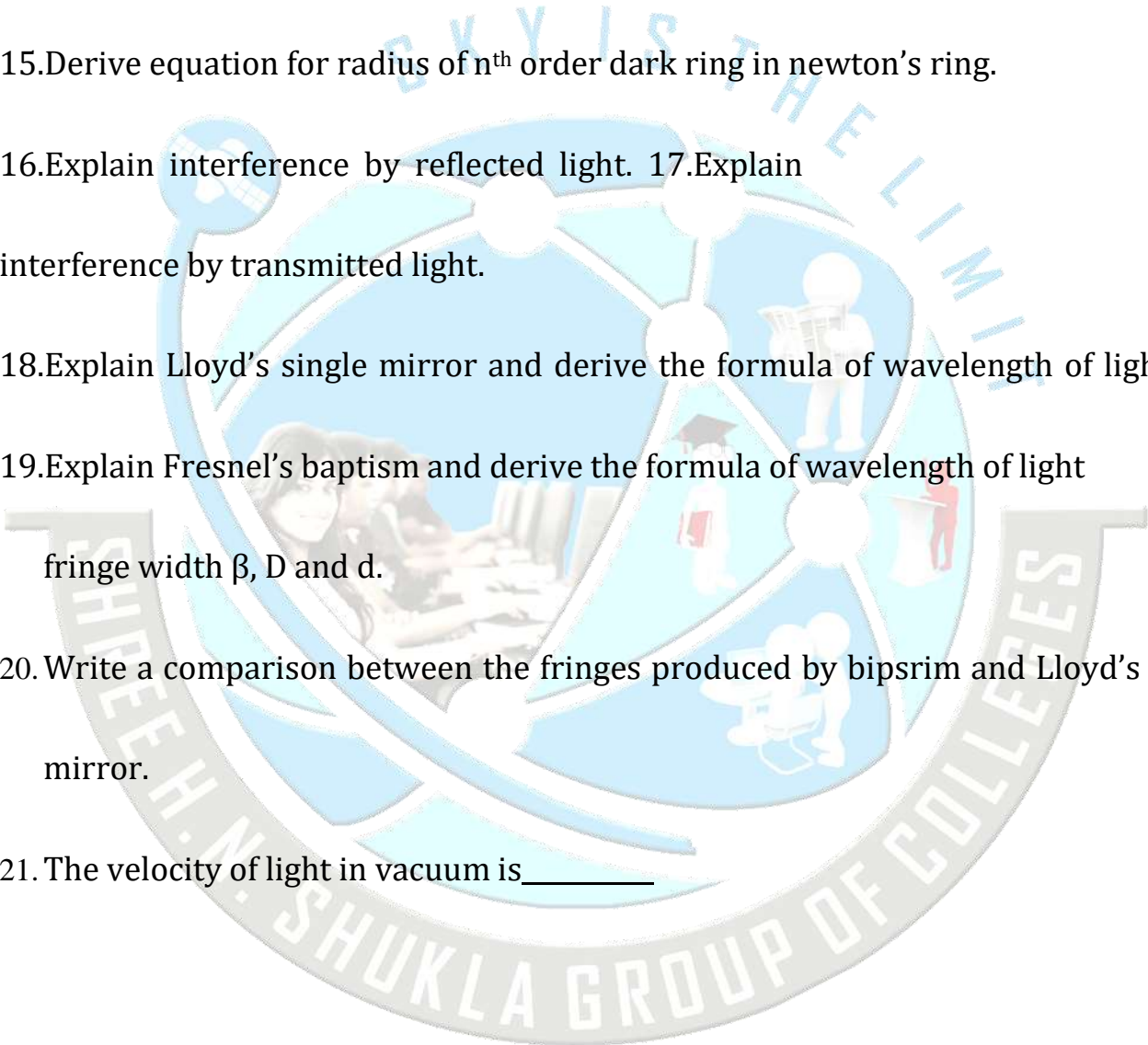
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Unit:3 Wave Optics: Interference

1. Which rays of a dispersed white light deviates more when passes through a prism?
2. What is path difference on reflection from a denser medium?
3. Whose angle of deviation is minimum?
4. The films are coloured due to_____.
5. The pattern produced by superposition of waves emitted by discrete coherent sources has been called the_____.
6. Soap bubble looks coloured upon_____.
7. _____cannot produce two coherent sources.
8. Young's experiments established that_____.
9. Newton's ring illustrates the phenomenon of_____.
10. What superposition of wave?
11. Define types of interference.

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12. Discuss Huygens's principle.
13. Describes superposition of waves.
14. Determination of wave length of sodium light using Newton's rings.
15. Derive equation for radius of n^{th} order dark ring in Newton's ring.
16. Explain interference by reflected light. 17. Explain interference by transmitted light.
18. Explain Lloyd's single mirror and derive the formula of wavelength of light.
19. Explain Fresnel's biprism and derive the formula of wavelength of light fringe width β , D and d .
20. Write a comparison between the fringes produced by biprism and Lloyd's mirror.
21. The velocity of light in vacuum is _____
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Unit:-4 Wave Optics: Diffraction

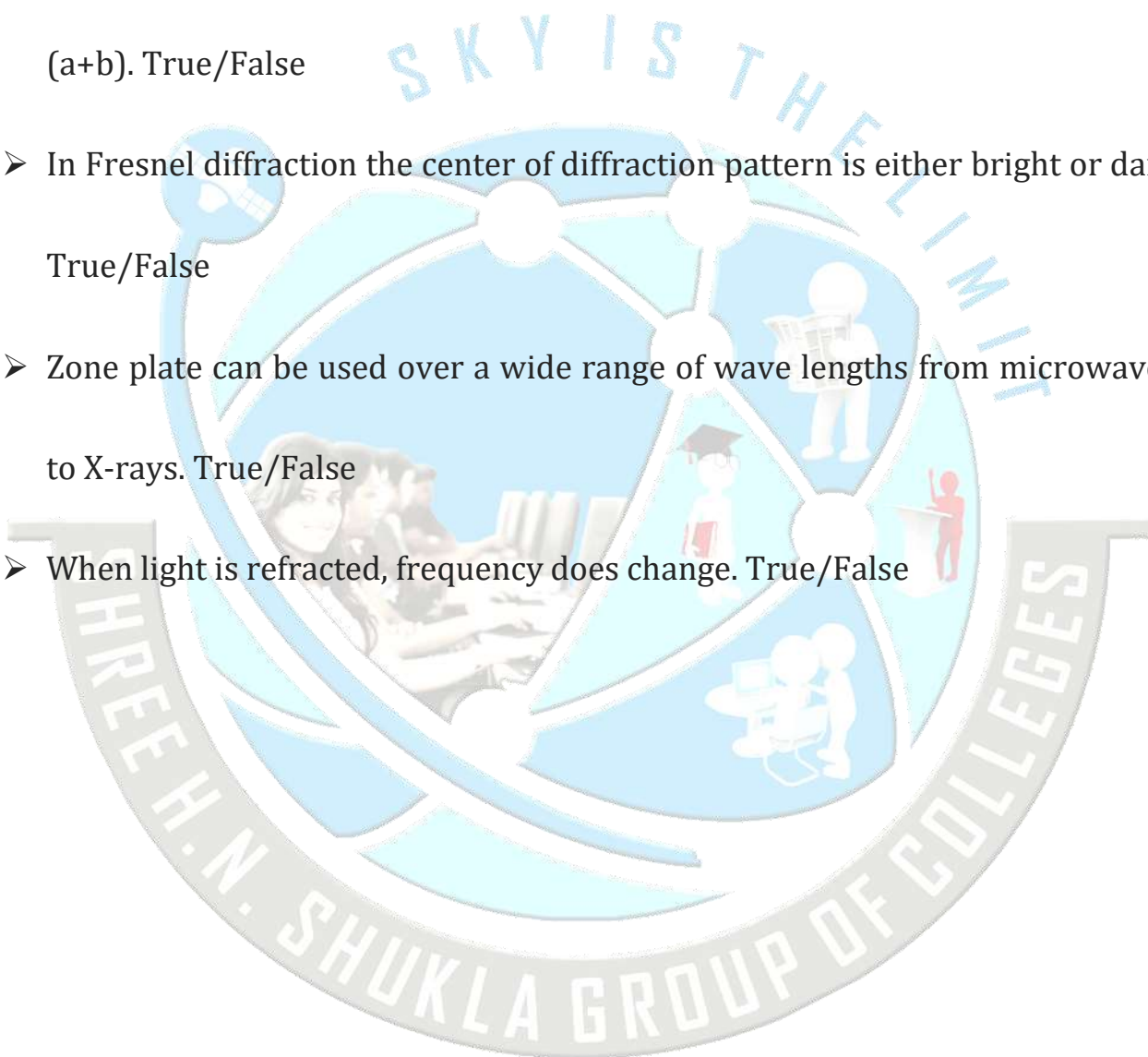
1. What is difference between interference and diffraction?
2. Writ a name of type of diffraction.
3. Writ a four difference between Fresnel and fraunhofer diffraction.
4. The focal length of a zone plate is _____proportional to the wavelength.
5. What is plane diffraction grating?
6. What is zone plate and how it constructs?
7. Discuss Fresnel's diffraction.
8. Discuss Fraunhofer diffraction.
9. _____are important for analysis of Fresnel diffraction.
10. Explain the meaning of Fresnel's half period zones. Show that (i) The radii of the zone are proportional to \sqrt{n} where $n=1,2,3$ etc. and (ii) The area of various half period zones are independent of the order of the zone n .
11. Discuss Fraunhofer diffraction pattern due to a straight edge.

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❖ True and false.

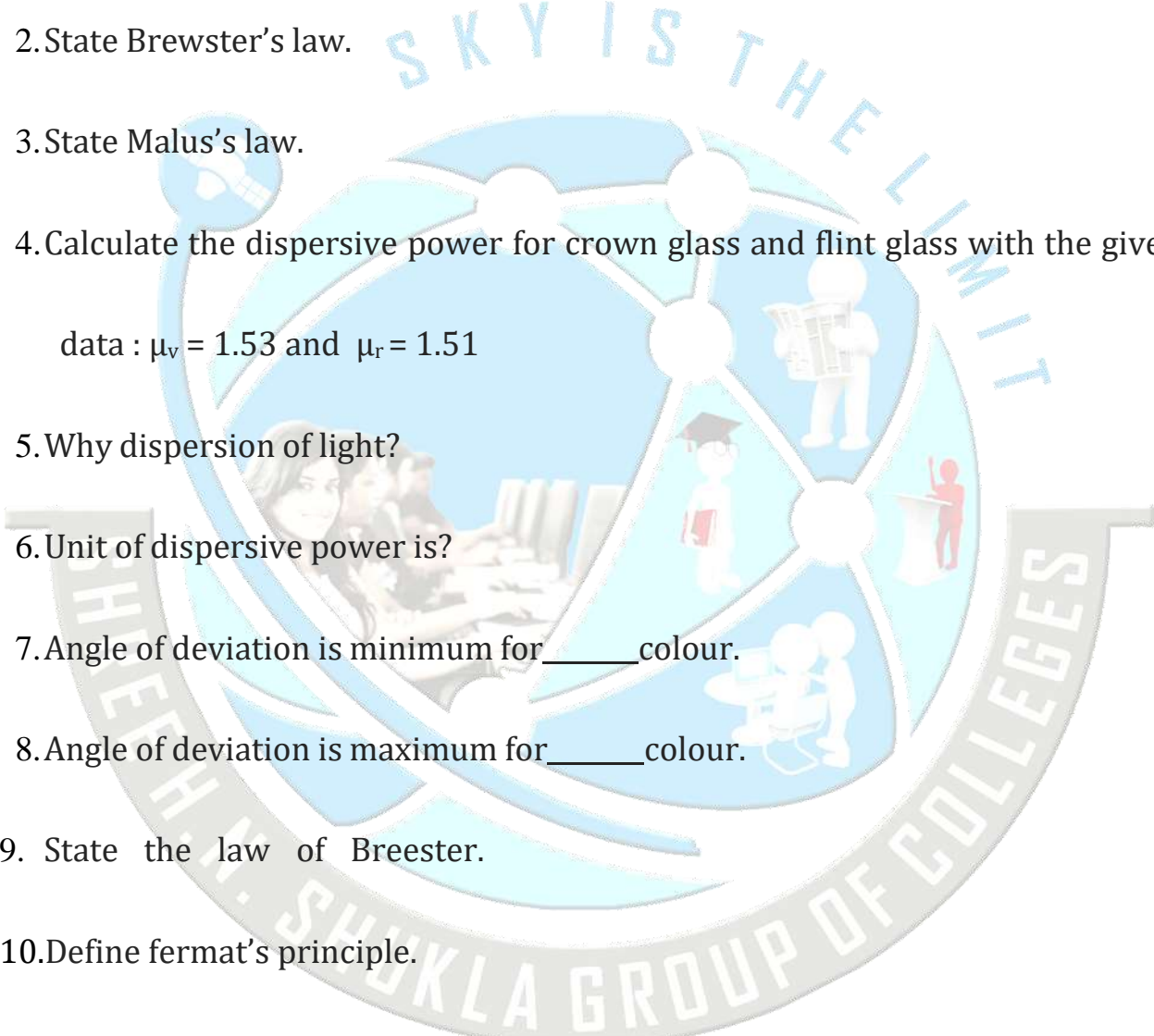
- Diffraction will not occur if the wave is coherent. True/False
- Angular separation is directly proportion to the distance between the two slit
($a+b$). True/False
- In Fresnel diffraction the center of diffraction pattern is either bright or dark.
True/False
- Zone plate can be used over a wide range of wave lengths from microwave
to X-rays. True/False
- When light is refracted, frequency does change. True/False



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Unit:5 Wave Optics: Polarization and Geometrical Optics.

1. Define: (1) Unpolarised light (2) Polarized light (3) plane Polarized light (4) plane of vibration (5) plan of polarization.
 2. State Brewster's law.
 3. State Malus's law.
 4. Calculate the dispersive power for crown glass and flint glass with the given data : $\mu_v = 1.53$ and $\mu_r = 1.51$
 5. Why dispersion of light?
 6. Unit of dispersive power is?
 7. Angle of deviation is minimum for _____ colour.
 8. Angle of deviation is maximum for _____ colour.
 9. State the law of Breester.
 10. Define fermat's principle.
 11. What do you understand by the term polarization of light?
 12. What are the plane of polarization and plan of vibration?
 13. Write short notes on polarizer and analyzer.
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14. Define dispersive power.

15. Write short notes on polarization by double refraction.

16. Define cardinal points of a lens system.

17. Show that the distance between principle point is the same as distance between nodal points.

18. Discuss Fermat's principle and prove laws of reflection.

19. Derive a dispersive power of prism.

20. Discuss properties of nodal points.

21. State and prove Malus's law.

