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MDA- Phy (1) Sub/Gen

B.Sc. Part-1 Examination, 2011

(PHYSICS)

Paper-Sub/Gen

Full marks : 75

Time: 3 hours

The figure in the right-hand margin indicate marks  
Candidates are required to give their answers in their  
own words as far as practicable

GROUP-A

Answer all questions

1. Mark the correct answer:

i. Modulus of rigidity is defined by

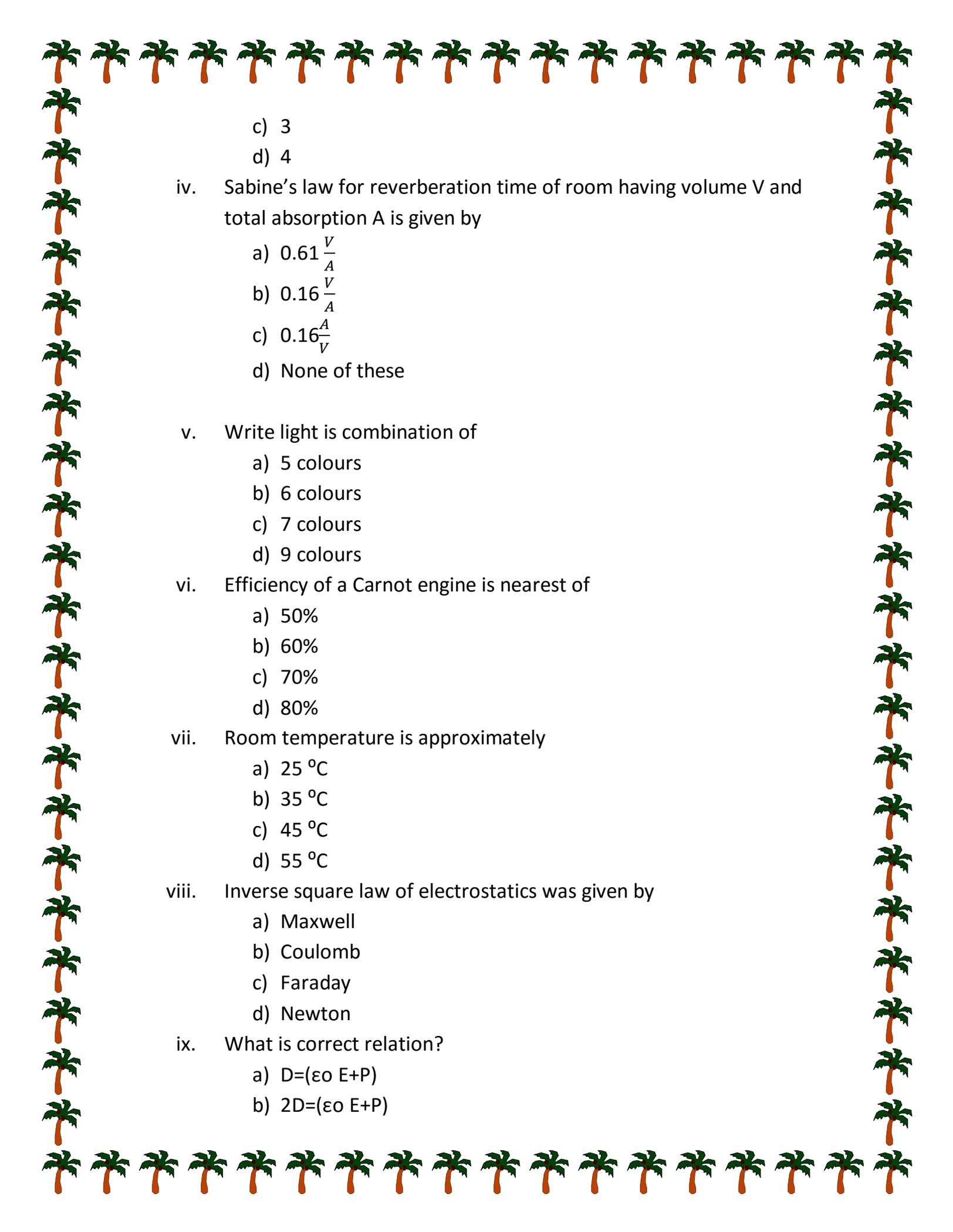
- a)  $\frac{\text{Longitudnal stress}}{\text{Longitudnal strain}}$
- b)  $\frac{\text{Volume stress}}{\text{Volume strain}}$
- c)  $\frac{\text{Shearing stress}}{\text{Shearing strain}}$
- d) None of these

ii. Relation between  $\Upsilon$ ,  $x$  and  $\sigma$  is

- a)  $\Upsilon=3x(1-\sigma)$
- b)  $\Upsilon=3x(1-2\sigma)$
- c)  $\Upsilon=2x(1-\sigma)$
- d)  $\Upsilon=2x(1+\sigma)$

iii. The number of degree of freedom for monatomic gas is

- a) 1
- b) 2



c) 3

d) 4

iv. Sabine's law for reverberation time of room having volume  $V$  and total absorption  $A$  is given by

a)  $0.61 \frac{V}{A}$

b)  $0.16 \frac{V}{A}$

c)  $0.16 \frac{A}{V}$

d) None of these

v. Write light is combination of

a) 5 colours

b) 6 colours

c) 7 colours

d) 9 colours

vi. Efficiency of a Carnot engine is nearest of

a) 50%

b) 60%

c) 70%

d) 80%

vii. Room temperature is approximately

a) 25 °C

b) 35 °C

c) 45 °C

d) 55 °C

viii. Inverse square law of electrostatics was given by

a) Maxwell

b) Coulomb

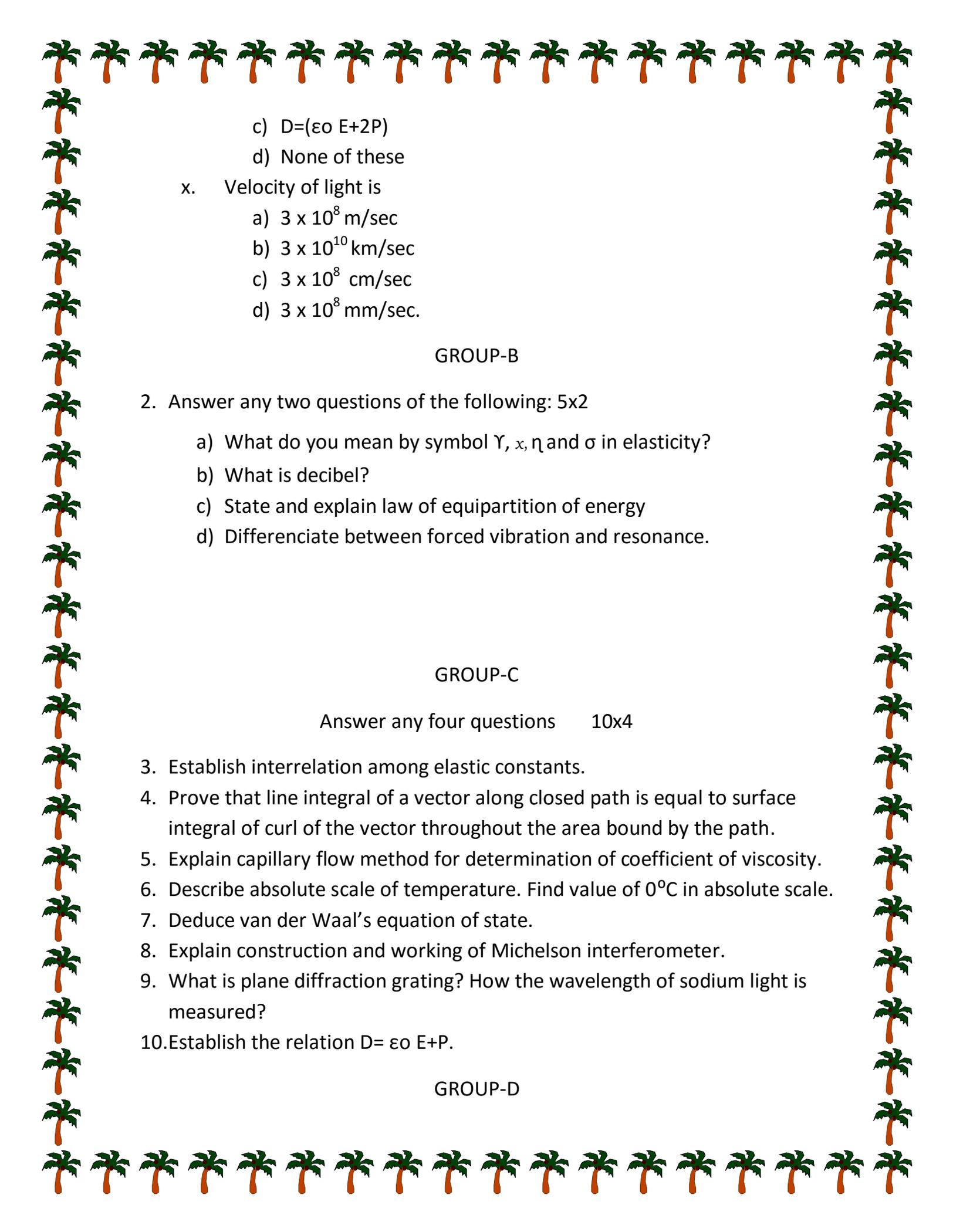
c) Faraday

d) Newton

ix. What is correct relation?

a)  $D = (\epsilon_0 E + P)$

b)  $2D = (\epsilon_0 E + P)$

- 
- c)  $D = (\epsilon_0 E + 2P)$   
d) None of these

- x. Velocity of light is
- a)  $3 \times 10^8$  m/sec
  - b)  $3 \times 10^{10}$  km/sec
  - c)  $3 \times 10^8$  cm/sec
  - d)  $3 \times 10^8$  mm/sec.

GROUP-B

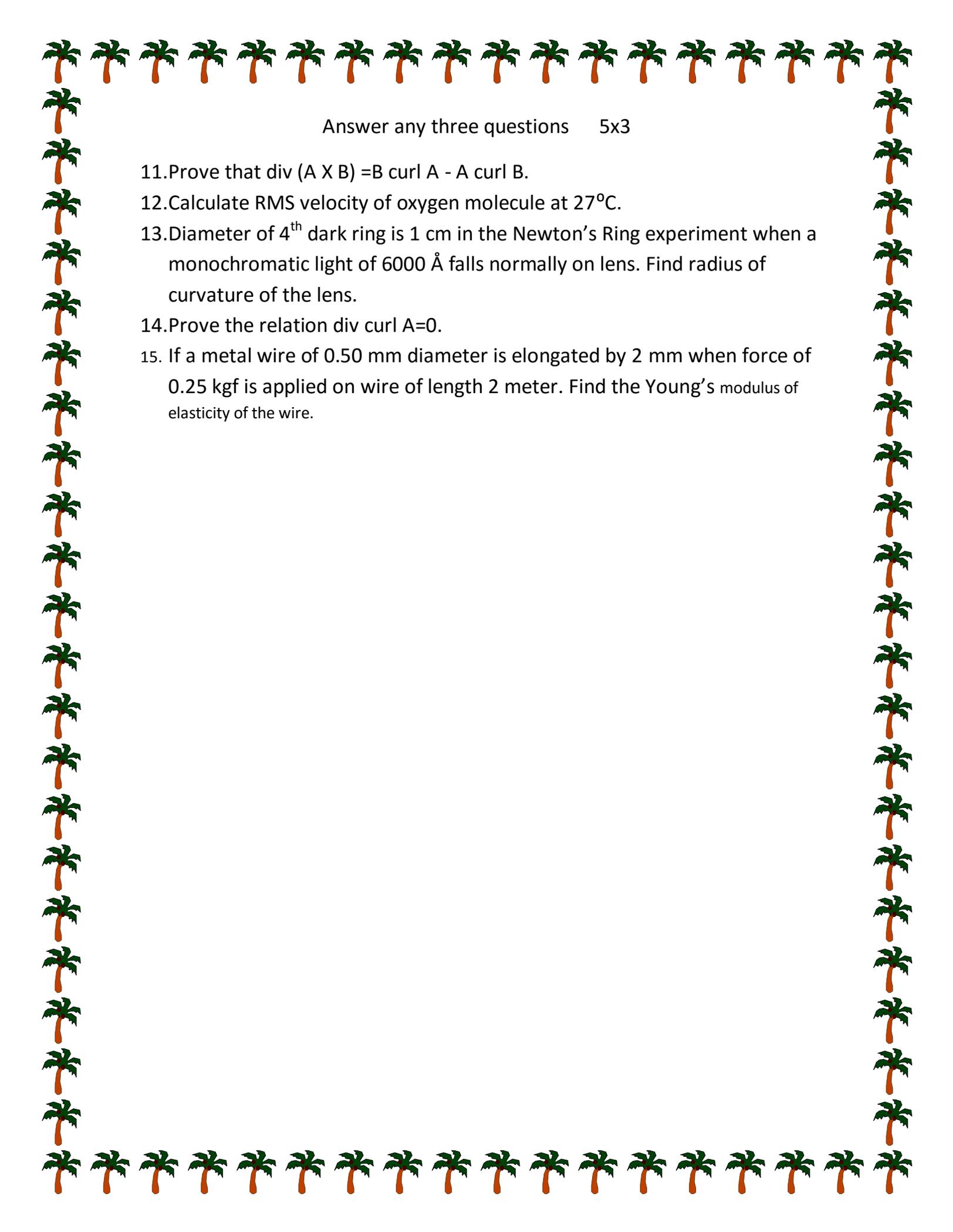
2. Answer any two questions of the following: 5x2
- a) What do you mean by symbol  $\Upsilon$ ,  $\alpha$ ,  $\eta$  and  $\sigma$  in elasticity?
  - b) What is decibel?
  - c) State and explain law of equipartition of energy
  - d) Differentiate between forced vibration and resonance.

GROUP-C

Answer any four questions 10x4

- 3. Establish interrelation among elastic constants.
- 4. Prove that line integral of a vector along closed path is equal to surface integral of curl of the vector throughout the area bound by the path.
- 5. Explain capillary flow method for determination of coefficient of viscosity.
- 6. Describe absolute scale of temperature. Find value of  $0^\circ\text{C}$  in absolute scale.
- 7. Deduce van der Waal's equation of state.
- 8. Explain construction and working of Michelson interferometer.
- 9. What is plane diffraction grating? How the wavelength of sodium light is measured?
- 10. Establish the relation  $D = \epsilon_0 E + P$ .

GROUP-D



Answer any three questions 5x3

11. Prove that  $\text{div} (\mathbf{A} \times \mathbf{B}) = \mathbf{B} \text{ curl } \mathbf{A} - \mathbf{A} \text{ curl } \mathbf{B}$ .
12. Calculate RMS velocity of oxygen molecule at  $27^\circ\text{C}$ .
13. Diameter of 4<sup>th</sup> dark ring is 1 cm in the Newton's Ring experiment when a monochromatic light of  $6000 \text{ \AA}$  falls normally on lens. Find radius of curvature of the lens.
14. Prove the relation  $\text{div curl } \mathbf{A} = 0$ .
15. If a metal wire of 0.50 mm diameter is elongated by 2 mm when force of 0.25 kgf is applied on wire of length 2 meter. Find the Young's modulus of elasticity of the wire.