

**3/MDC-214 Syllabus-2023**

**2 0 2 4**

( December )

**FYUP : 3rd Semester Examination**

**MULTIDISCIPLINARY COURSE**

**( Physics Around Us )**

**MDC-214**

*Marks : 56*

*Time : 2½ hours*

*The figures in the margin indicate full marks  
for the questions*

Answer *any four* questions from Section—A and  
*any four* from Section—B

**SECTION—A**

1. Define scalar and vector quantities with two examples each. 4
2. State Newton's third law of motion and give its three applications in daily life. 1+3=4
3. Define refractive index of a material. What is total internal reflection? Give one example of total internal reflection that occurs in daily life. 1+2+1=4

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*( Turn Over )*

4. What are myopia and hypermetropia? What kinds of lenses are used for the above defects?  $2+2=4$
5. Define current and voltage. What is the difference between alternating current (AC) and direct current (DC)? Give one application of each.  $2+1+1=4$
6. How many types of magnetism are there? State Faraday's law of electromagnetic induction and give its application.  $1+(1+2)=4$

## SECTION—B

7. (a) What are fundamental units? Write down the dimension of speed.  $1+1=2$
- (b) State Newton's law of gravitation. What are natural and artificial satellites?  $2+2=4$
- (c) Define potential energy and kinetic energy of a body. Write down their mathematical expressions. State and explain the law of conservation of energy.  $1+1+2=4$
8. (a) State Kepler's law of planetary motion. What is escape velocity and what is its value for the earth?  $3+1=4$

- (b) What is the difference between mass and weight? What do you mean by weightlessness?  $2+1=3$
- (c) What is inertia of rest? State Newton's first law of motion. Show that mass is a measure of inertia.  $1+1+1=3$
9. (a) Give the causes for the following phenomena :  $1\frac{1}{2}\times 3=4\frac{1}{2}$
- (i) Blue colour of the sky
  - (ii) Mirages
  - (iii) Sparkling of diamonds
- (b) What mirror is used for the rear view in a car? Explain the reason.  $1\frac{1}{2}$
- (c) Define (i) wave motion, (ii) frequency, (iii) wavelength and (iv) amplitude of a wave. 4
10. (a) What is power of a lens? For what type of lenses the power is negative?  $1+1=2$
- (b) What is a sound wave? What are longitudinal and transverse waves? How is an echo formed?  $1+2+1=4$
- (c) If the focal length of the convex lens is 10 cm, what is the power of the lens? What is astigmatism and how do we correct this defect of vision?  $2+2=4$

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11. (a) What are active and passive elements?  
Draw a simple circuit containing active  
and passive elements.  $1+3=4$
- (b) What are electromagnetic waves? What  
type of electromagnetic waves is used  
for telecommunication?  $4+2=6$
12. (a) The power ratings of a rice cooker and  
a room heater are 800 W and 1500 W  
respectively. What do these ratings  
indicate? What is BEE star rating?  $3+1=4$
- (b) State Archimedes principle and give one  
application.  $2+1=3$
- (c) State Bernoulli's theorem and give one  
application.  $2+1=3$

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