



**AB-3124**  
**B. Sc. (Sem. V) Examination**  
**March/April – 2015**  
**Physics**  
*(Engineering Physics)*

Time : Hours]

[Total Marks : 50

**Instructions :**

(1)

<p>नीचे दृष्टावेक निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : <b>B. SC. (SEM. V)</b></p> <p>Name of the Subject : <b>PHYSICS (ENGINEERING PHYSICS)</b></p> <p>Subject Code No. : <b>3 1 2 4</b> Section No. (1, 2,.....): <b>Nil</b></p>	<p>Seat No. : <input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/></p> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; width: 100%;">Student's Signature</div>
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- (2) Draw neat and clean diagram wherever necessary.
- (3) Symbols used in the paper have their usual meaning.
- (4) Figures to the right indicate full marks.
- (5) Student can use non-programmable scientific calculator wherever necessary.

- 1 Answer in brief : 8
- (1) What is gravitational constant ?
  - (2) What are natural satellites ?
  - (3) What do you mean by state of weightlessness ?
  - (4) Define compound pendulum.
  - (5) State Wien's law.
  - (6) Define reflecting Power and Transmitting Power.
  - (7) Define time of reverberation.
  - (8) What are supersonic waves and infrasonic waves ?

- 2 (a) Answer **any one** : 10
- (1) State Newton's laws of universal gravitation. What evidence is there in support of this law ? find relation between  $G$  and  $g$ .
  - (2) State the laws of heat radiation. Give suitable experiments to illustrate properties of heat radiation.

**OR**

- 2 (b) Answer **any one** : 4
- (1) A sphere of mass 40 kg is attracted by second sphere of mass 15 kg. When their centres are 20 cm apart with a force equal to  $10^{-4}$  gm-wt. Calculate the constant of gravitation.
- (2) A copper rod 19 cm long and of  $0.785 \text{ cm}^2$  area of cross-section thermally insulated is heated at one end through  $100^\circ\text{C}$  while the other end is kept at  $30^\circ\text{C}$ . Calculate the amount of heat which will flow in 10 minutes along the way. Thermal conductivity of copper  $380 \text{ W/m}^\circ\text{K}$ .
- 3 (a) Answer **any one** : 10
- (1) What do you understand by a black body ? State and explain Kirchhoff's law of heat radiations.
- (2) Define reverberation period for a hall. Explain clearly what, caused reverberation and how it can be minimized.
- 3 (b) Answer **any one** : 4
- (1) A sphere of radius 6.0 cm at  $1200^\circ\text{C}$  is suspended in a vacuum in an enclosure at  $500^\circ\text{C}$ . Find the rate of loss of heat of the sphere assuming that it is a black body.  
Take  $\sigma = 5.7 \times 10^{-8} \text{ W m}^{-2} \text{ }^\circ\text{K}^{-4}$ .
- (2) A quartz crystal of thickness of 0.001 metre is vibrating at resonance. Calculate the fundamental frequency. Given  $Y$  for quartz =  $7.9 \times 10^{10}$  Newton/m<sup>2</sup> and  $\rho$  for quartz =  $2650 \text{ kg/m}^3$ .
- 4 Write Short Note **any two** : 14
- (1) Sources of error in the measurement of "g"
- (2) Kepler's laws of planetary motion
- (3) Newton's law of cooling
- (4) Acoustics of building.