



AD-3213
B. Sc. (Sem. VI) Examination
March/April – 2015
Physics : Paper - VI

Time : Hours]

[Total Marks : 50

Instructions : (1)

<p>नीचे दशांशवैक निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : ☛ B. SC. (SEM. VI)</p> <p>Name of the Subject : ☛ PHYSICS : PAPER - VI</p> <p>☛ Subject Code No. : 3 2 1 3 ☛ Section No. (1, 2,.....): Nil</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"/><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) Figures to the right indicate full marks of the question.
- (3) Symbols used in the question paper have their usual meaning.
- (4) Students are allowed to use a non-programmable scientific calculator.

1 Answer the following in brief : 8

- (1) Define inertial frame of reference.
- (2) What is the Newtonian principle of relativity?
- (3) Write the unit of angular momentum.
- (4) Define a rigid body.
- (5) What is nutation?
- (6) What is a complex number?
- (7) Define Fourier series.
- (8) What is domain?

- 2** (a) Answer any one in detail: **10**
- (1) Explain the effect of Coriolis force on free fall of a body on earth's surface. Derive necessary equation of deviation.
 - (2) Derive general expressions for angular momentum and rotational kinetic energy of a rigid body.
- (b) Attempt any one : **4**
- (1) A Body having mass of 5 kg is allowed to fall freely from a height of 300 m above the surface of the earth. Calculate the time of flight and displacement due to Coriolis force at the equator. (take $g_e = 981 \text{ cm/s}^2$)
 - (2) Position vector of a particle is $(2\hat{i} + 4\hat{j} + 8\hat{k}) \text{ m}$ and its velocity vector is $(\hat{i} + 2\hat{j} + 4\hat{k}) \text{ m/s}$. Find the angular momentum of a particle. Mass of the particle is 1.0 kg.
- 3** (a) Answer any one in detail. **10**
- (1) Evaluate the coefficients of Fourier's series.
 - (2) State and prove the fundamental laws of complex algebra.
- (b) Attempt any one. **4**
- (1) Obtain the Fourier's series for a function $f(x)$, where

$$f(x) = \cos x \text{ for } 0 \leq x \leq \pi$$

$$f(x) = -\cos x \text{ for } -\pi \leq x \leq 0$$
 - (2) Prove that modulus of the sum of two complex numbers does never exceed the sum of their moduli.

- 4 Give answer of any two in detail. 14
- (1) Write a note of Foucault pendulum.
 - (2) Obtain Euler's equation of motion for rigid body.
 - (3) Define complex conjugate and explain its laws.
 - (4) State and prove the necessary condition for a function $f(z)$ to be an analytic.
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