**Vision IIT** 'Kota'

**Test**

**MCQ**

Module: Physics Test - Paper 1
Exam-code: 112013052801                    Date: May 29$^{th}$ 2013
Teacher: Mr. Ram Mishra                         Time: 16:00-17:30
Subject: Physics                               Number of pages: 4

**Allowed materials**

| | | | |
|---|---|---|---|
| Paper | ❏No | ✔Yes, | ✔scratch paper |
| | | | ❏lined paper |
| | | | ❏squared paper |
| Pocket calculator | ✔No | ❏Yes | |
| Syllabus | ✔No | ❏Yes | |
| Books | ✔No | ❏Yes | |
| Other study materials | ✔No | ❏Yes | |
| Hand in Exam questions | ❏No | ✔Yes | |

**Remarks**

- Remember to check your name and student number on the Optical Response Sheet (ORS).

- This exam has 24 questions.

- Each question carries **3 marks**.

- For an incorrect answer you will be given **-1 mark**.

- Completely fill out the black boxes with a soft black pencil. Thus like this: ⬤ and not like: ⊗.

- Make sure that the stapled pins are removed from the ORS.

- Some questions have one or more correct answers. Such questions are marked with a ♣.

- Hand in your ORS completely. Not handing in your ORS results in no grade. Note that your ORS is numbered!

**Student Name:** ...................................................................

**Student Number:** ...................................................................
**Class: 11**$^{th}$

**Question 1**   The dimension of quantity $\frac{L}{RCV}$ is

(A) [A]

● [A]$^{-1}$

(C) [A]$^2$

(D) None of these

**Question 2**   A physical quantity x depends on quantities y and z as follows: $x = Ay + \tan Cz$ where A, B and C are constants. Which of the following do not have the same dimensions

● x and A

(B) C and z$^{-1}$

(C) y and $\frac{A}{B}$

(D) x and B

**Question 3**   Which of the two have same dimensions

(A) Force and strain

(B) Energy and strain

(C) Force and stress

● Angular velocity and frequency

**Question 4**   Dimensional formula of capacitance is

(A) ML$^{-2}$T$^{-4}$A$^2$

(B) M$^{-1}$L$^{-2}$T$^{-4}$A$^{-2}$

● M$^{-1}$L$^{-2}$T$^4$A$^2$

(D) ML$^2$T$^4$A$^{-2}$

**Question 5**   The magnitude of a given vector with end points (4,–4,0) and (–2,–2,0) must be . . .

● $2\sqrt{10}$

(B) 6

(C) $5\sqrt{2}$

(D) 4

**Question 6**   100 coplanar forces each equal to 10 N act on a body. Each force makes angle $\frac{\pi}{50}$ with the preceding force. What is the resultant of the forces ?

(A) 250 N

(B) 500 N

(C) 1000 N

● Zero

**Question 7**   ML$^3$T$^{-1}$Q$^{-2}$ is the dimension of

(A) Conductivity

● Resistivity

(C) Resistance

(D) None of these

**Question 8**   The dimensions of pressure is equal to

(A) Energy

● Energy per unit volume

(C) Force

(D) Force per unit volume

**Question 9**   The dimensional formula for impulse is

(A) ML$^2$T$^{-1}$

(B) M$^2$LT$^{-1}$

(C) MLT$^{-2}$

● MLT$^{-1}$

**Question 10**   The quantity x=$\frac{\varepsilon_0 LV}{t}$; here $\varepsilon_0$ is the permittivity of free space, L is length, V is potential difference and t is time. The dimensions of X are same as that of

(A) Charge

● Current

(C) Voltage

(D) Resistance

**Question 11** The dimensions of universal gravitational constant are

● $M^{-1}L^3T^{-2}$

(C) $M^{-2}L^2T^{-2}$

(B) $ML^2T^{-2}$

(D) $ML^{-1}T^{-2}$

**Question 12** How many minimum number of coplanar vectors having different magnitudes can be added to give zero resultant ?

● 3

(C) 4

(B) 2

(D) 5

**Question 13** Given vector $\vec{A} = 2\hat{i} + 3\hat{j}$ the angle between $\vec{A}$ and $y - axis$ is ...

(A) $\cos^{-1}\frac{2}{3}$

(C) $\tan^{-1}\frac{3}{2}$

● $\tan^{-1}\frac{2}{3}$

(D) $\sin^{-1}\frac{2}{3}$

**Question 14** The angles which a vector $\hat{i} + \hat{j} + \sqrt{2}\hat{k}$ makes with X, Y and Z axes respectively are ...

(A) $45°, 45°, 60°$

(C) $60°, 60°, 60°$

(B) $45°, 45°, 45°$

● $60°, 60°, 45°$

**Question 15** The unit of permittivity of free space $\varepsilon_0$ is

● coulomb$^2$/ Newton-metre$^2$

(C) coulomb$^2$/ (Newton-metre)$^2$

(B) Newton-metre$^2$/coulomb$^2$

(D) Coulomb/Newton-metre

**Question 16** The expression $(\frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{j})$ is a ...

(A) Vector of magnitude $\sqrt{2}$

● Unit Vector

(B) Scalar

(D) Null Vector

**Question 17** Let $\varepsilon_0$ denotes the dimensional formula of the permittivity of the vacuum and $\mu_0$ that of the permeability of the vacuum. If M = mass, L= length, T= time and I= electric current, then

(A) $\varepsilon_0 = M^{-1}L^{-3}T^4I^2$

(C) $\mu_0 = ML^2T^{-1}I$

(B) $\varepsilon_0 = M^{-1}L^{-3}T^2I$

● $\mu_0 = ML\ T^{-2}I^{-2}$

**Question 18** Two quantities A and B have different dimensions. Which mathematical operation given below is physically meaningful

(A) None of these

(C) A + B

● A/B

(D) A - B

**Question 19** Identify the pair whose dimensions are equal

● Torque and work

(C) Stress and energy

(B) Force and work

(D) Force and stress

**Question 20** How many wavelength of Kr$^{38}$ are there in one metre

(A) 652189.63

(C) 2348123.73

● 1650763.73

(D) 1553164.13

**Question 21** L, C and R represent physical quantities inductance, capacitance and resistance respectively. The combination which has the dimensions of frequency is

(A) $\frac{1}{\sqrt{LC}}$

● $\frac{1}{RC}$ and $\frac{R}{L}$

(C) $\frac{C}{L}$

(D) $\frac{1}{\sqrt{RC}}$ and $\sqrt{\frac{R}{L}}$

**Question 22** A hall has the dimensions 10m x 12m x 14m .A fly starting at one corner ends up at a diametrically opposite corner. What is the magnitude of its displacement?

● 21m

(B) 17m

(C) 36m

(D) 26m

**Question 23** Light year is a unit of

(A) Time

(B) Energy

● Distance

(D) Mass

**Question 24** $0.4\hat{i} + 0.8\hat{j} + c\hat{k}$ represents a unit vector when c is . . .

(A) -0.2

(B) $\sqrt{0.8}$

(C) 0

● $\sqrt{0.2}$

Optical Response Sheet

+2/5/51+

Student Number

0/0 Réservéd Ⓐ R1 Ⓑ R2

Name and Surname

YASH BARAD

Student Number:

V05311029

Encode your student number in the boxes on the left. Make all boxes on this page that apply completely black with pencil or felt tip.

| | | |
|---|---|---|
| 0/3 | Question 1: Ⓐ ⓧ Ⓒ Ⓓ | |
| 3/3 | Question 2: ⓧ Ⓑ Ⓒ Ⓓ | |
| 3/3 | Question 3: Ⓐ Ⓑ Ⓒ ⓧ | |
| 3/3 | Question 4: Ⓐ Ⓑ ⓧ Ⓓ | |
| 3/3 | Question 5: ⓧ Ⓑ Ⓒ Ⓓ | |
| 3/3 | Question 6: Ⓐ Ⓑ Ⓒ ⓧ | |
| 0/3 | Question 7: Ⓐ ⓧ Ⓒ Ⓓ | |
| -1/3 | Question 8: Ⓐ ⓧ Ⓒ ● | |
| 3/3 | Question 9: Ⓐ Ⓑ Ⓒ ⓧ | |
| 0/3 | Question 10: Ⓐ ⓧ Ⓒ Ⓓ | |
| 3/3 | Question 11: ⓧ Ⓑ Ⓒ Ⓓ | |
| 0/3 | Question 12: ⓧ Ⓑ Ⓒ Ⓓ | |
| -1/3 | Question 13: Ⓐ ⓧ ● Ⓓ | |
| -1/3 | Question 14: ● Ⓑ Ⓒ ⓧ | |
| 0/3 | Question 15: ⓧ Ⓑ Ⓒ Ⓓ | |
| 3/3 | Question 16: Ⓐ Ⓑ ⓧ Ⓓ | |
| 0/3 | Question 17: Ⓐ Ⓑ Ⓒ ⓧ | |
| 3/3 | Question 18: Ⓐ ⓧ Ⓒ Ⓓ | |
| 3/3 | Question 19: ⓧ Ⓑ Ⓒ Ⓓ | |
| 3/3 | Question 20: Ⓐ ⓧ Ⓒ Ⓓ | |
| 0/3 | Question 21: Ⓐ ⓧ Ⓒ Ⓓ | |
| 0/3 | Question 22: ⓧ Ⓑ Ⓒ Ⓓ | |
| 3/3 | Question 23: Ⓐ Ⓑ ⓧ Ⓓ | |
| -1/3 | Question 24: ● Ⓑ Ⓒ ⓧ | |