DHAKA COACHING CENTRE

GRAND TEST 2020-2021

Class: XI **Max. Marks: 85**

Paper: Physics **Duration: 2 Hours**

Section "A" (COMPULSORY)

MULTIPLE CHOICE QUESTIONS (MCQ'S) 42 Marks

NOTE:

i) This section consist of 42 part questions and all are to be answered each question carries one mark.

ii) Do not copy the part questions in your answer book. Write only the answer in full against the proper number of the question and its part.

iii) The code of your question paper is to be written in bold letters in the beginning of the answer script.

iv) The use of scientific calculator is allowed. All notations are used in their usual meanings.

Q1. Select the most appropriate answer for each from the given options:

i) The dimension of G is:

*$ML^{-2}T^3$ *$M^{-1}L^{-2}T^3$ *$M^{-1}L^3T^{-2}$ *$M^{-1}L^2T^2$

ii) Kelvin is the S.Iunit of:

* Luminous Intensity * electric current * Mass * temperature

iii) Pinhole Camera was designed by:

*Ibn- Al – Haitham * Al-Beruni * Al-Khawarizmi * Al-Kindi

iv) If **A . B**= 0,**AxB** = 0, and **A**≠ 0, then **B** is:

* equal to A *perpendicular to A *parallel to A *zero

v) The S.I. Unit of loudness of sound is:

* Watt * Diopter * Sone * Decibel

vi) The acceleration of a body moving down a frictionless planed inclined at 30^0 will be:

* 4.9 m/s^2 * 9.8 m/s^2 * 98 m/s^2 * 10 m/s^2

vii) The horizontal range of a projectile depends upon:

* The angle of projection * "g" at the place

* The velocity of the projectile * All of them

viii) While passing through extreme position the speed of body executing SHM becomes:

* Zero * Maximum * One third * Minimum

ix) The rate of change of angular momentum with respect to time is:

* Force * Angular velocity

* Angular acceleration * Torque

x) Light year is the unit of:

*time *Energy *Intensity *Distance

xi) The rate of doing work is maximum when the angle between force and velocity is:

* 0^o * 45^0 * 180^0 * 90^0

xii) Least distance of distinct vision

* increases with increase in age * decrease with increaser in age

* neither increases nor decreases * becomes infinite after 60 years

xiii) In young's double-slit experiment, the condition for the constructive interference is that the path difference must be:

* An odd multiple of the half wavelength * An odd multiple of the whole wavelength

* An integral multiple of the wavelength * An even number of the wavelength

xiv) The length of Astronomical telescope is equal to:
*f_o/f_e * $f_o - f_e$ * $f_e - f_o$ * $f_0 + f_e$

xv) A vector which can be displaced parallel to its self and applied at any point is known as a:
* Parallel vector * Free Vector * Unit vector * Zero vector

xvi) A one kilogram stone, falling freely from a height of 10m, strikes the ground with a velocity of:
*14m/s * 10m/s *98m/s *19.6m/s

xvii) Maximum number of rectangular components are.
* One * Two * Three * Four

xviii) When a body is thrown vertically upwards, it is a case of:
* Free fall motion * Projectile motion
* under gravity motion *uniform motion

xix) During long jump, athlete runs before taking the jump. By doing so he.
* Provide him a larger inertia * Decrease his inertia
* Decrease his momentum * Increase his momentum

xx) If force of friction is negligible, then acceleration of two free falling objects of different masses are:
* The same * Different
* Smaller mass has smaller acceleration * heavier body has greater acceleration

xxi) The angle of projection for which the horizontal range and maximum height becomes equal is
* Tan^{-1} 1/4 * Tan^{-1} 1/2 * Tan^{-1} 4 * Tan^{-1} 2

xxii) The expression for centripetal acceleration is given as:
* v/r * r/v^2 * r^2/v * v^2/r

xxiii) It is better to use long spanner rather than a short one when tighten a nut or a bolt because
* Less force needs to be exerted by the user * Less friction in present
* Less tuning effects is required on the spanner * Less moment arm is needed

xxiv) Torque is defined as the time rate of change of:
*Angular momentum *Angular velocity
*Linear velocity *Angular acceleration

xxv) The ocean tides are caused by gravitational force exerted on earth by:
* moon * sun * both the sun and moon * Jupiter

xxvi) When a person goes down to the bottom of deep mine compared to his weight ht will _____.
* Remain same * Increase * Decrease * become zero

xxvii) The Work done by a conservative field around a closed path is:
* Positive * negative * Zero * None

xxviii) When a car accelerates up a hill slope it is said to be:
* Loss of both P.E & K.E * Gain of both P.E & K.E
* Gain of P.E & Loss of K.E * Gain of K.E & Loss of P.E

xxix) If the mass and speed both are doubled, the kinetic energy of the moving body:
*Increases 8 times * Increases 4 times
* Increases 6 Times * Remains same

xxx) Work energy equation is simply:
* Law of conservation of mass * Law of conservation of energy
* Law of conservation of linear momentum * Law of conservation of momentum

xxxi) Quality of sound depends upon:
* Frequency *loudness * time period * wave form

xxxii) The velocity of sound in space:
*332m/sec * 344m/sec * 320m/sec *zero

xxxiii) A pendulum clock is running fast, it can be corrected by making this pendulum:
* Longer * Shorter * Heavier * Lighter

xxxiv) SI unit of intensity of sound is:
*watt/m^2 *decibel *weber *diopter

xxxv) Double slit arrangement is suggested by Young in order to obtain:
* Monochromatic light * Phase coherence
* Constructive interference * stable interference pattern

xxxvi) The condition for interference in thin films is reversed b/c of
*Small thickness *Refraction *Phase reversal *Diffraction.

xxxvii) Two sources of light are said to be coherent if _____.
* They produce waves of the same wave length
* They have the same amplitude of vibration
* They produce waves in the medium simultaneously
* They produce waves of the same amplitude

xxxviii) If we narrow the distance between two slits in Young's experiment the fringe width:
* Increases * Decreases * Remains same * Becomes zero

xxxix) The point to which the light rays are brought to focus is called:
* Principle Focus * Optical Axis * Centre of curvature * centre of mass

xL) If the magnification of the lens is 10 and the image distance is 20cm then the object distance is:
* 2cm * 4cm * 6cm * 8 cm

xLi) Distance between two consecutive crests or troughs is known as
* pitch * wavelength * frequency * velocity

xLii) If an Astronomical telescope has an objective of focal length 900mm. and the focal length of its eyes piece is5mm. the magnifying power of the telescope will be:
* 4500 * 180 * 895 * 905

SECTION B (SHORT-ANSWER QUESTION) 25 MARKS

Q2: Attempt any five questions.

(i) Show that a) Dot product obeys distributive law.
b) Cross product do not obey commutative law.

(ii) For what value of p are the two vectors **A**= **i** -p **j**+3**k** & **B**= 3**i**+2**j** – 4**k** perpendicular to each other.

(iii) Drive an expression for range of projectile.

(iv) How is the magnifying power of the (i) Astronomical telescope and (ii) compound microscope affected by increasing the focal length of their objectives?

(v) Prove that following equations are dimensionally correct.
a) $2as = V_f^2 - V_i^2$ b) $f = \frac{1}{2\pi}\sqrt{g/l}$

(vi) How far apart the diffracting planes in a sodium chloride crystals for which X-rays of wavelength $1.54A^o$ make a glancing angle of $15^o54'$ in the 1^{st} order.

(vii) Note of frequency of 500 Hz is being emitted by an ambulance moving towards a listener at rest. If the listener detects a frequency of 526 Hz, calculate the speed of the ambulance. Speed of sound is 340 m/s at that moment.

(viii) A truck starts from rest at the top of a slope which is 1 m high and 49 m long. Find its acceleration and speed at the bottom of the slope assuming that friction is negligible

(ix) A diver leaps from a tower with an initial horizontal velocity component of 7 m/s and upward velocity component of 3 m/s. Find the component of her position after 1 second

SECTION C (DETAILED ANSWER QUESTIONS) (18 Marks)

NOTE: Attempt any One question from this section.

Q3a) Derive relationships i) between linear and angular velocities
ii) between linear and angular accelerations (06)

b) What is Hooke's law? Prove that mass spring system has simple harmonic motion. (06)

c) Give Newton's formula for speed of sound. What corrections made by Laplace in it, Discuss. (06)

Q4a) What is an inclined plane? A block of mass "m" is placed on an inclined surface; derive the expression for its acceleration when the block is sliding down in presence and absence of friction. (06)

b) Describe Michelson's interferometer. How we can find monochromatic light by using it. (06)

c) With the help of ray diagram. Derive relation for magnifying power of Astronomical telescope. (06)