AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XII

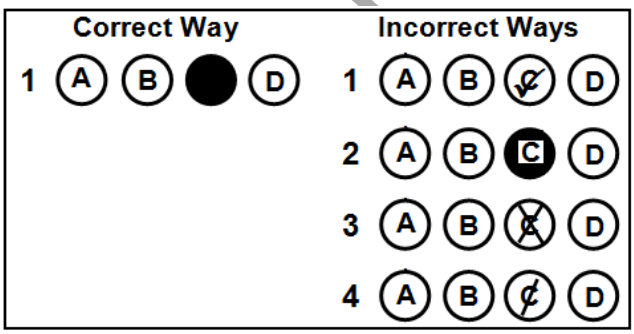
MODEL EXAMINATION PAPER 2020

Physics Paper I

Time: 50 minutes Marks: 35

INSTRUCTIONS

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 35 only.
4. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.



Candidate's Signature

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. You may use a scientific calculator if you wish.

1. The electrostatic force between two point charges in free space is 'F'. If a dielectric slab of relative permittivity 'ε_r' is inserted in their free space, then this force between the charges will

   A. increase.
   B. decrease.
   C. remain constant.
   D. vary unpredictably.

2. If the electric field intensity between two charged parallel plates have the magnitude 2×10^2 N/C, then the magnitude of electrostatic force on an electron in the electric field will be

   (**Note**: The charge on the electron is equal to 1.6×10^{-19} C.)

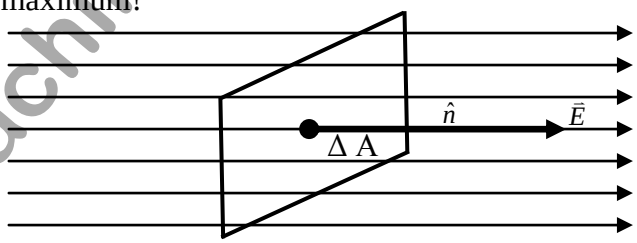
   A. 8.0×10^{-22} N
   B. 3.2×10^{-17} N
   C. 2.0×10^{2} N
   D. 1.2×10^{21} N

3. When electric flux passes through any surface, then all of the following are the factors on which it depends EXCEPT the

   A. area of the surface.
   B. nature of the surface.
   C. intensity of the electric field.
   D. direction of the surface relative to the electric field.

4. In the given figure, the maximum electric flux is passing through the given area. At what angle will the flux reduce to half of the maximum?

   A. 30°
   B. 45°
   C. 60°
   D. 90°



5. The direction of conventional current flowing in an electric circuit is always from

   A. negative to positive terminals only.
   B. positive to negative terminals only.
   C. negative to positive terminals and vice versa.
   D. positive to negative terminals and vice versa.

6. When the resistance remains constant, the graph of Ohm's law shows a/ an

   A. ellipse.
   B. parabola.
   C. hyperbola.
   D. straight line.

7. The electrical device used to measure the value of an unknown resistance is a

   A. rheostat.
   B. voltmetre.
   C. galvanometer.
   D. Wheatstone bridge.

8. Which of the following factors does NOT affect the resistance of a metallic conductor at constant temperature?

   A. Type of the conductor
   B. Length of the conductor
   C. Surface area of the conductor
   D. Cross-sectional area of the conductor

9. A 100 W bulb and a 20 W LED (light emitting diode) are connected with a 220 V power supply.

   When the power supply is turned on, then greater resistance is experienced by the

   A. 20 W LED, because it glows less bright.
   B. 20 W LED, because it draws less current.
   C. 100 W bulb, because it glows more bright.
   D. 100 W bulb, because it draws more current.

10. A current carrying conductor experiences maximum magnetic force in a uniform magnetic field when the conductor is placed

    A. parallel to the magnetic field.
    B. perpendicular to the magnetic field.
    C. at an angle of 30^{o} to the magnetic field.
    D. at an angle of 60^{o} to the magnetic field.

11. For the accurate measurement of electric current passing through a circuit, the resistance of the ammetre should be

    A. lesser than the circuit resistance.
    B. greater than the circuit resistance.
    C. equal or lesser than the circuit resistance.
    D. equal or greater than the circuit resistance.

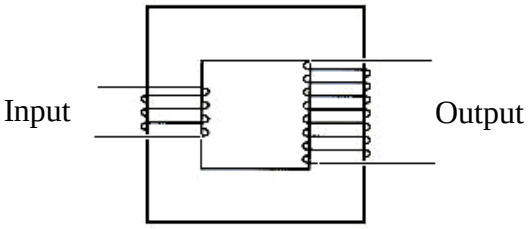
12. An electromotive force (e.m.f.) is induced in a circuit when the magnetic flux through the circuit is

    A. low.
    B. high.
    C. varying.
    D. constant.

13. If an electric motor is overloaded, then the magnitude of back electromotive force (e.m.f.) will

A. increase.
B. decrease.
C. become zero.
D. remain the same.

14. Consider the following diagram of a working transformer.



Which statement is CORRECT about the transformer?

I. Input voltage is equal to output voltage.
II. Input voltage is less than output voltage.
III. Input voltage is greater than output voltage.

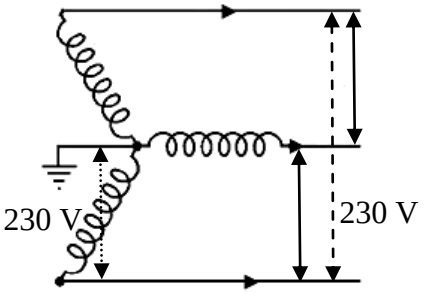
A. II only
B. III only
C. I and II
D. I and III

15. At high frequency, the current through a capacitor of an alternating current circuit will be

A. zero.
B. large.
C. small.
D. varying unpredictably.

16. The voltage across any two power lines of a three phase alternating current supply is

A. 220 V
B. 400 V
C. 440 V
D. 1100 V



17. In terms of structure, nylon is an example of

A. glassy solids.
B. polymeric solids.
C. crystalline solids.
D. amorphous solids.

18. In terms of energy band, semiconductor materials at room temperature do NOT have

A. partially filled valence band.
B. partially filled conduction band.
C. plenty of free electrons for electrical conduction.
D. narrow forbidden energy gap between conduction and valence band.

19. In the forward biasing, the resistance offered by a p-n junction diode

A. is low.
B. is zero.
C. is high.
D. varies.

20. All of the following semiconductor devices are based on p-n junction EXCEPT

A. photo diode.
B. electrolytic cell.
C. photo voltaic cell.
D. light emitting diode.

21. Which of the following type of impurity is used to convert a pure semi-conductor into p-type semi-conductor?

A. Divalent
B. Trivalent
C. Pentavalent
D. Monovalent

22. In daily life, the relative change in mass, length and time of an object cannot be observed because the

A. size of the object is very small.
B. mass of the object is very large.
C. speed of the object is equal to the speed of light.
D. speed of the object is much smaller than that of light.

23. The range of wavelength of radiations emitted by a hot body at different temperature is

A. infinite.
B. discrete.
C. continuous.
D. discontinuous.

24. In photoelectric effect, electrons are emitted only when light falls upon a metal surface and exceeds at a certain minimum

A. velocity.
B. intensity.
C. frequency.
D. wavelength.

25. The scattering of X-rays by loosely bounded electrons is known as

A. compton effect.
B. pair production.
C. pair annihilation.
D. photoelectric effect.

26. Intensity of radiation emitted by a black body is directly proportional to the fourth power of temperature in Kelvin. This statement is known as the

A. Compton's effect.
B. Plank's radiation law.
C. Stefan-Boltzmann law.
D. De-Broglie's hypothesis.

27. De-Broglie's hypothesis of wave nature of particles is applicable to

A. small masses with very low speed.
B. large masses moving with low speed.
C. large masses moving with high speed.
D. small masses moving with very high speed.

28. A non-inertial frame of reference is that which

A. is always at rest.
B. has zero acceleration.
C. moves with uniform velocity.
D. moves with some acceleration.

29. The spectrum obtained by the radiations that emit from a hydrogen filled discharged tube is

A. line spectrum.
B. band spectrum.
C. absorption spectrum.
D. continuous spectrum.

30. By emitting X-rays, an atom

A. attains the ground state.
B. attains the excited state.
C. becomes single ionised.
D. becomes double ionised.

31. When a radioactive nucleus emits an alpha particle, its atomic mass drops by

A. 1 atomic mass unit (u).
B. 2 atomic mass unit (u).
C. 4 atomic mass unit (u).
D. 8 atomic mass unit (u).

32. Which of the following is/ are affected by the electric and magnetic fields?

I. Alpha particle
II. Beta particle
III. Gamma rays

A. I only.
B. III only.
C. I and II.
D. II and III.

33. The explosion of an atomic bomb occurs as a result of

A. controlled fusion reaction.
B. controlled fission reaction.
C. uncontrolled fusion reaction.
D. uncontrolled fission reaction.

34. Which of the following basic particles of an atom CORRECTLY corresponds with the mass and charge of a positron?

	Mass of Positron	**Charge of Positron**
A	Proton	Electron
B	Electron	Proton
C	Neutron	Proton
D	Neutron	Electron

35. In an atomic reactor, the core is used to

A. protect uranium from neutrons.
B. produce heat by fission reaction.
C. absorb the fast moving neutrons.
D. accelerate the slow moving neutrons.

END OF PAPER

Please use this page for rough work