Model Question of HSC Examination 2015

(English Version)

Subject : Physics 2nd Paper (Creative)

Time : 1 Hours 10 Minutes   **Full Marks — 40**

### [Answer any four questions]

1. ▶ An electron of rest mass 9×10^{-31} Kg is in motion with a velocity 0.99c.
a. What is time dialation? 1
b. How the length of a a bar in a moving frame is changed to the obsever of a stationary frame? 2
c. Find the total energy of the electron? 3
d. Compare the Newtnoian and relativistic kinetic energies of the electron. 4

2. ▶ The frequency and the voltage of a sec. and 230V respectively.
a. Define angle of dip. 1
b. Explain Biot Savert law. 2
c. Find the equation of the E.M.F of alternating current using the data's of the stem. 3
d. After how much time the value of current will be zero? Explain mathematically 4
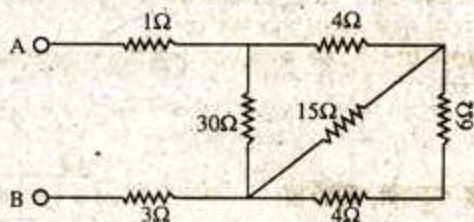
3. ▶

a. What is wheatstone bridge? 1
b. State Kirchoff's law 2
c. Calculate the equivalent resistance from this circuit. 3
d. Compare the equivalent resistance's when all are connected in series and all are connected in parallel. 4

4. ▶In Young's double slit expeiment the distance between two slits 2.0 mm. The senartion between two consecutive fringes at a distance 1m from the slits is found be 0.295 mm.
a. What is called electromagnetic wave? 1
b. Explain with diagran Hygens's priniciple. 2
c. Find the wavelength of light. 3
d. Desciribe Young's double slit experiment and discuss the conditions of formation of bright and dark fringes. 4

5. ▶
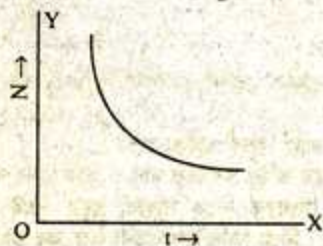
a. Define mass defect. 1
b. Explain fusion and fission. 2
c. From the above figure calcuate $N = N.e^{\lambda l}$ 3
d. Is it possible to make the relation between $T_{1/2}$ and τ by the above stimulus? Explain it mathematically. 4

6. ▶
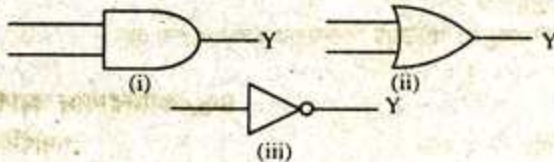
a. Define AND gate. 1
b. Ttansformation of Hexadecimal Number to Decimal Number $(19E)_{16} =$? 2
c. With the above figure draw the circuit or exclusive OR gate. 3
d. Write the truth table for the figure B and from it explain gate operation. 4

[Darken the circle (O) with black ball point pen from the alternatives]

1. Which one is the correct value of the triple point of water?
   ⓐ 273.16°C   ⓑ 273.16K
   ⓒ 273K   ⓓ 273°C

2. What is the maximum efficiency of a reversible engine which is working between temperatures 167°C and 57°C?
   ⓐ 15%   ⓑ 20%
   ⓒ 25%   ⓓ 30%

3. Which one is the unit of entropy?
   ⓐ jk^{-1} ⓑ jkg^{-1}
   ⓒ jkm^{-1} ⓓ jkg

4. The capacitance of a capacitor does not depends on—
   ⓐ Size of the plate ⓑ Shape of the palte
   ⓒ Charges on the plate
   ⓓ Separation between the plate

5. Electric energy of a capacitor is—
   i. $\frac{1}{2}CV^2$
   ii. $\frac{1}{2}QV$
   iii. $\frac{1}{2}\frac{Q^2}{C}$
   Which one of the following is correct?
   ⓐ i   ⓑ iii
   ⓒ i & ii   ⓓ i & iii

6. To increase the capacitance of a parallel plate capacitor, the distance between two plates needs to—
   ⓐ move away   ⓑ bring nearer
   ⓒ make smaller ⓓ None

Here, E = 2v, r = 0.5 and R = 10Ω

7. What is the amount of current flow through this circuit?
   ⓐ 1A   ⓑ 0.21A
   ⓒ 0.3A   ⓓ 0.196 A

8. Shunt is used to—
   ⓐ Increase the main flow.
   ⓑ Decrease the main flow.
   ⓒ Made the main flow zero.
   ⓓ None

9. What is the unit of specific resistance?
   i. Ohm   ii. Ohm-miter (Ω-m)
   iii. Siemens
   Which one of the following is correct?
   ⓐ i   ⓑ ii
   ⓒ iii   ⓓ i & iii

10. Kirchhoff's 1st law is—
    i. $\Sigma ir = \Sigma E$ ii. $\Sigma i = 0$
    iii. $\Sigma ir = 0$
    Which one of the following is correct?
    ⓐ ii   ⓑ i & ii
    ⓒ ii & iii   ⓓ i & iii

11. Curie point is obtained for—
    ⓐ Dia -Magnet   ⓑ Para-magnet,
    ⓒ Ferro-magnet   ⓓ None

12. The unit of magnetic flux is—
    ⓐ Ampere   ⓑ Weber
    ⓒ Tesla   ⓓ Gauss

13. What is the equation of magnetic field due to straight wire carrying current?
    ⓐ $B = \mu_0 I/2\pi a$ ⓑ $B = \mu_0 I/4\pi a$
    ⓒ $B = \mu_0 a/2\pi I$ ⓓ $B = \mu_0 a/4\pi a$

See the figure & answer the question no. 14, 15, 16 & 17

Here, n_p = 200 turns, E_p = 220V & E_s = 11V

14. This is the figure of.....
    ⓐ Generator
    ⓑ Electric motor
    ⓒ Step down transformer
    ⓓ Step up transformer

15. The figure acts on.........
    i. Eelectromagnet
    ii. Electric current
    iii. Electromagnetic Induction
    Which one of the following is correct?
    ⓐ i   ⓑ ii
    ⓒ iii   ⓓ i & ii

16. In our practical life, this device is used in
    i. Radio device   ii. Telephone
    iii. Television
    Which one of the following is correct?
    ⓐ i & ii   ⓑ ii & iii
    ⓒ i & iii   ⓓ i, ii & iii

17. What is the transformation constant?
    ⓐ 1/20   ⓑ 1/10
    ⓒ 3/20   ⓓ 5/2

18. The refractive index of glass and water with respect to air respectively 3/2 and 4/3. What is the refractive idex of water with repsect to glass—
    ⓐ $\frac{1}{9}$ ⓑ 2
    ⓒ 8/9   ⓓ 9/8

19. The critical angle of glass with respect to vacuum is 41°–
    i. The optical density of glass is less than that of vacuum.
    ii. When light incidents on glass from vacuum at an angle 41° the angle of refraaction is 90°.
    iii. When light incidents on vacuum from glass at an angle 41° the angle of refraction is 90°.
    Which one of the following is correct?
    ⓐ i   ⓑ ii
    ⓒ iii   ⓓ i, ii & iii

20. Who invented compound microscope?
    ⓐ Newton   ⓑ Galileo
    ⓒ Kepler   ⓓ Plank

See the figure & answer the questions no. 21 & 22

Here, an object of length 5cm is placed 15cm away from a convex lens & the image distance is 30cm.

21. What is the length of image?
    ⓐ 5/2cm   ⓑ 2/3cm
    ⓒ –10cm   ⓓ 10cm

22. Which statement is correct for this figure?
    ⓐ The object is virtual but the image is real
    ⓑ The object is real but the image is virtual
    ⓒ The object palced out side the 1st principal focus & the image is found out side of 2nd principal focus
    ⓓ The object placed in side the 1st principal focus focus & the image is found in side of 2nd principal focus.

23. 1 eV equivalent to—
    ⓐ 1.6×10^{-9} J   ⓑ 1.6×10^{9}J
    ⓒ 1.6×10^{-19}J   ⓓ 1.6×10^{19}J

24. If an object moves with a velocity of light, its length will be?
    ⓐ zero   ⓑ Infinity
    ⓒ Same   ⓓ None

25. An object moving with velocity of light will have the mass.
    ⓐ Zero   ⓑ Infinity
    ⓒ Same   ⓓ None

26. If the velocity of the system is negligible, Lorentz transformation transforms into—
    ⓐ Maxwellam transformation
    ⓑ Galilian transformation
    ⓒ Newtonian transformation
    ⓓ None

Read the passage & answer the questions no. 27 & 28. The rest mass of atomic particle is 2.5×10^{-27}kg

27. What is its rest energy?
    ⓐ 2.25×10^{-10}J   ⓑ 1.4×10^{-9}J
    ⓒ 2.25×10^{10}J   ⓓ 1.4×10^{9} J

28. When the particle moves with 9C then what its total energy?
    ⓐ 5.61×10^{-10}J   ⓑ 5.16×10^{-10}J
    ⓒ 5.53×10^{-10}J   ⓓ 5.15×10^{-10}J

29. How many diodes are used in full wave bridge rectifier?
    ⓐ 1   ⓑ 2
    ⓒ 3   ⓓ 4

30. What is the value of energy gap in a conductor?
    ⓐ 6ev   ⓑ 1.1ev
    ⓒ 0.71eV   ⓓ 0V

Read the passage & answer the questions no.31 & 32
For 10mA emitter curent in a transistor the collector current becomes 9.5mA.

31. What is the base current of transistor?
    ⓐ 19.5mA   ⓑ –0.5mA
    ⓒ 0.5mA   ⓓ –19.5mA

32. What is the current Amplification factor and current gain?
    ⓐ 0.95 & 19   ⓑ 1.05&0.05
    ⓒ 20&19   ⓓ 0.95 & 0.05

33. Final stage of life of the star having mass $3M_0$ will be –
    ⓐ Black Hole   ⓑ White Dwarf
    ⓒ Neutron Star   ⓓ None

34. Image formed in astronomical telescope is—
    ⓐ Erect   ⓑ Invert
    ⓒ Erect and long ⓓ Invert and short

35. Which stage comes earlier in the life of a star?
    ⓐ Proto star   ⓑ Neutron star
    ⓒ Super nova   ⓓ White dwarf

1	ⓑ	2	ⓒ	3	ⓐ	4	ⓒ	5	ⓓ	6	ⓑ	7	ⓓ	8	ⓐ	9	ⓑ	10	ⓑ	11	ⓒ	12	ⓑ	13	ⓐ	14	ⓒ	15	ⓒ	16	ⓓ
17	ⓐ	18	ⓒ	19	ⓑ	20	ⓑ	21	ⓓ	22	ⓒ	23	ⓒ	24	ⓐ	25	ⓑ	26	ⓑ	27	ⓐ	28	ⓑ	29	ⓓ	30	ⓓ	31	ⓒ	32	ⓐ
33	ⓐ	34	ⓑ	35	ⓐ																										