PSEB Board Paper +2 [2017]
PHYSICS

Time allowed : 3 hrs   **MM. : 70**

General Instructions :
(i) All questions are compulsory.
(ii) Questions number 1 to 5 are very short answer questions and carry 1 mark each.
(iii) Questions number 6 to 10 are short answer questions and carry 2 marks each.
(iv) questions number 11 to 22 are also short answer questions and carry 3 marks each.
(v) Question number 23 is a value based question and carries 4 marks.
(vi) Questions number 24 to 26 are long answer questions and carry 5 marks each.
(vii) Use log tables, if necessary. Use of calculators is not allowed.

One marks questions

Q1. The specific resistance of a conductor increase with
   (a) Increase in temperature.
   (b) Increase in cross-sectional area.
   (c) Decrease in length.
   (d) Decrease in cross-sectional area.

Q2. The following truth table represent

A	B	Y
0	0	1
1	0	0
0	1	0
1	1	0

(a) And gate (b) NOR gate (c) OR gate (d) NAND gate

Q3. An electron of mass' m' and charge 'e' is accelerated from rest through a potential difference 'v' in vacuum. Its final velocity will be.

$(a)\dfrac{eV}{2m}$ $(b)\dfrac{eV}{m}$ $(c)\sqrt{\dfrac{2eV}{m}}$ $(d)\sqrt{\dfrac{eV}{m}}$

Q4. Write whether the given statement is true or false: The magnetic susceptibility (x_m) of a paramagnetic substance has a small negative value.

Q5. Name the three basic elements of a communication system.

Q6. Which has greater ionising power : alpha particle or beta particle?

Q7. Write the following radiations in an ascending order in respect of their frequencies : X-rays, Microwaves, UV (ultra-violet) rays and radio waves.

Q8. State Lenz's law of electromagnetic induction .

Two marks questions

Q9. A wire has resistance of 10.5Ω at $21°C$ and $136.4\ \Omega$ at $147°C$. Find the value of temperature coefficient of resistance

Q10. What type of magnetic material is used in making electromagnets and why?

Q11. An induced Current has no direction of its own. Explain, why?

Q12. The small ozone layer on top of the stratosphere is crucial for human survival. Why?

Q13. Write the conditions for total internal reflection to take place.

Q14. In Young 's double slit experiment, the slits are separated by 0.56mm and the screen is placed 2.8m away. The distance between the central bright fringe and the fifth bright fringe is 1.5cm. Find the wavelength of light used.

Q15. For common emitter amplifier, dc (direct current) current gain is 100. If the base current is $20\ \mu A$. Calculate the collector and emitter current.

Q16. Why sky wave propagation is not possible for high frequency radio waves?

Four marks questions

Q17. Derive an expression for energy stored in capacitor. In which form energy is stored?

Or

Obtain the equivalent capacitance of the network is given figure. For a 300V supply, Determine the charge across capacitor C_4.
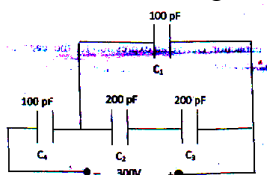
Q18. With the help of a circuit diagram, explain how a metre bridge can be used to find the unknown resistance of a given wire.

Q19. Derive an expression for a average power of an AC (alternating current) circuit.

Q20. What is photoelectric effect? Explain the effect of increase of (i) frequency (ii) intensity of Intensity of incident radiation on photoelectric current with suitable graphs.

Or

Light of wavelength 2200 $A°$ (angstrom) falls on a photosensitive plate with work function 4.1 eV. Find (a) energy of photon in eV (electron volt), (b) maximum kinetic energy of photoelectron and (c) stopping potential.

Q21. State radioactive decay law. Prove that radioactive decay is exponential in nature.

Q22. With the help of circuit diagram, explain the V-I characteristics of p-n junction diode in Forward biasing.

Q23. State Huygens's principle. Using Huygens' wave theory, prove the laws of reflection.

Six marks questions

Q24.(a) Which physical quantity has its SI unit (1) Cm (2) N/C

(b)Two point charges q and -q is placed at a distance 2a apart. Calculate the electric field at a point P situated at a distance r along the perpendicular dissector of the line joining the charges. What is the electric field when r>> a ? Also, give direction of electric field w.r.t electric dipole moment?

or

(a) A Charged rod P attracts rod R Whereas P repels another charged rod Q. what type of force is developed between Q and R ?

(b) Define the capacitance of capacitor. Derive an expression for the capacity of a parallel

plate capacitor with a dielectric slab placed in between the plates of capacitor.

Q25. (a) What is shunt?

(b) State Ampere's circuital law. Using this law, obtain an expression for the magnetic field well inside the solenoid of finite length.

<div align="center">Or</div>

(a) Define one tesla.

(b) Derive an expression for force experienced by a current carrying straight conductor placed in a magnetic field. How can we find the direction of force?

Q26. (a) What are characteristics of image formed by a plane mirror?

(b)By giving sign conventions made, derive the mirror formula for a concave mirror.

<div align="center">Or</div>

(a) What is least distance of distinct vision for a normal human eye?

(b) With the help of labelled diagram, give the principle and magnifying power of Astronomical telescope, when final image is formed at least distance of distinct vision.