

Q-1 Multiple Choice Questions.

(10)

- Which of this diode is used in rectifier circuit?
(a) Power Diode (b) Zener Diode (c) varactor diode (d) LED's
- In a forward bias, PN junction diode offers _____ resistance.
(a) very high (b) very low (c) infinite (d) zero
- Which of these is used to increase or decrease the input ac voltages to desired voltage level?
(a) Transformer (b) Rectifier (c) Filter (d) Regulator
- Which part of a transistor is largest in size?
(a) emitter (b) collector (c) base (d) battery
- The Gallium Arsenide Phosphide (GaAsP) LED's are used to emit _____.
(a) Red light (b) Infrared radiation (c) Blue light (d) yellow light
- In tuner units, _____ diode is used.
(a) varactor Diode (b) Zener Diode (c) power diode (d) LED's
- An atomic nucleus does not have _____.
(a) electron (b) proton (c) neutron (d) None
- The half life of a radioactive element with decay constant λ is _____.
(a) $6.93/\lambda$ (b) $0.693/\lambda$ (c) $\lambda/0.693$ (d) $\lambda/2$
- The "Compton shift" is = _____.
(a) 2.42 \AA (b) 0.242 \AA (c) 0.0242 \AA (d) 24.2 \AA
- For smaller wavelength, the plank's radiation law becomes _____ law.
(a) Rayleigh's Jean's (b) Compton (c) Lummer (d) Wien's

Q-2 Answer in short. (Any Ten)

(20)

- What is Rectifier? Why we need it?
- Define: (i) Ripple factor (ii) Rectification efficiency.
- Draw the circuit of centre tap rectifier and label its components.
- What is a semiconductor diode? State their important characteristics.
- Draw the common emitter (CE) configuration for PNP transistor.
- Define emitter injection ratio (γ) and base transportation factor (β').
- Find the density of ${}_{6}\text{C}^{12}$ nucleus. ($1 \text{ u} = 1.66 \times 10^{-27} \text{ kg/u}$ and $R_0 = 1.2 \text{ fm}$)
- Give the application of nuclear magnetic resonance (NMR).
- Calculate the Decay constant if the half life of a nuclei is 5hr.
- State the limitation of Bohr atom model.
- State Heisenberg's uncertainty principle.
- Draw the labelled schematic diagram of Davission and Germer experiment.

- Q-3 (a) Explain the working and construction of Half wave rectifier. (05)
(b) For a Half wave rectifier obtains the value of ripple factor and show that its maximum rectification efficiency is 40.6 % . (05)

OR

- Q-3 (a) What is a filter circuit? With suitable diagram explain the working of series inductor filter. (05)
(b) Explain construction and filtering action of LC filter. (05)

- Q-4 (a) What is zener diode? Explain zener diode as a voltage regulator. (05)
(b) What is LED? How it differs from other diodes? Draw its circuit symbol. Discuss its advantages and applications. (05)

OR

- Q-4 (a) Explain amplifying action of transistor in detail. (05)
(b) Draw the circuit diagram to determine static characteristics of a PNP transistor in CE mode. Explain output characteristics and also discuss output resistance and current gain of a transistor. (05)

- Q-5 (a) Define binding energy per nucleon for atomic nuclei. Draw the curve for binding energy per nucleon verses mass number and discuss its outcomes. (05)
(b) Write a short note on "Stable nuclei". (05)

OR

- Q-5 (a) For a liquid drop model of nucleus, obtain the formula for binding energy of the nucleus. (05)
(b) Write a short note on "Radiometric dating". (05)

- Q-6 (a) Draw the heat radiation curve of a black body and discuss its features. State Plank's assumptions for black body radiation and derive plank's radiation law in terms of wavelength. (10)

OR

- Q-6 (a) What is Compton effect? Derive expression for change in wavelength of a scattered photon in a Compton effect. Discuss effect of angle of scattering and define Compton shift. (10)
