FEDERAL PUBLIC SERVICE COMMISSION
COMPETITIVE EXAMINATION-2017
FOR RECRUITMENT TO POSTS IN BS-17
UNDER THE FEDERAL GOVERNMENT

Roll Number

PHYSICS, PAPER-II

TIME ALLOWED: THREE HOURS	PART-I (MCQS)	MAXIMUM MARKS = 20
PART-I(MCQS): MAXIMUM 30 MINUTES	PART-II	MAXIMUM MARKS = 80

NOTE: (i) Part-II is to be attempted on the separate **Answer Book.**
  (ii) Attempt **ONLY FOUR** questions from **PART-II. ALL** questions carry **EQUAL** marks.
  (iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.
  (iv) Candidate must write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.
  (v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.
  (vi) Extra attempt of any question or any part of the attempted question will not be considered.
  (vii) Use of Calculator is allowed.

PART-II

Q. No. 2. **(a)** What is dipole moment? Obtain the expression for the potential and field due to an electric dipole. **(10)**

(b) Calculate the potential at a point on the axis of circular plastic disk of radius R, one surface of which carries a uniform charge density . **(8)**

(c) Why do we use unit "electron volts"? **(2)** **(20)**

Q. No. 3. **(a)** State and explain the Biot Savart law. **(4)**

(b) State and prove Ampere's law. Apply it to calculate the magnetic field due to a solenoid. **(10)**

(c) A long straight wire carries a current of 20 Amperes. An electron at 2.0 cm from the wire is travelling at a speed of 10^7 m/sec. What force acts on the electron if its motion is directed (1) towards the wire, (2) parallel to the wire and (3) at right angles to the direction given in (1) and (2). **(6)** **(20)**

Q. No. 4. **(a)** Write the Maxwell's equations and explain the significance of each equation. **(6)**

(b) Deduce the Maxwell equations for free space and also prove that electromagnetic waves are transverse. **(12)**

(c) What is index of refraction? **(2)** **(20)**

Q. No. 5. **(a)** Describe the Stern Gerlach experiment that provided experimental evidence of the space quantization of atomic magnetic moments. **(10)**

(b) What is the physical significance of the three quantum numbers n, 1, and m in the labelling of the hydrogenic wave functions? **(6)**

(c) What do you understand by strange particles? **(4)** **(20)**

Q. No. 6. **(a)** What is liquid drop model of nucleus and write down its essential features? **(8)**

(b) What are magic numbers? How can they be generated on the basis of shell model? **(8)**

(c) What is nuclear fusion? **(4)** **(20)**

Q. No. 7. **(a)** Differentiate the Metals, Semiconductors and Insulators on the basis of Energy Band Theory. **(6)**

(b) What is a rectifier? How we can use diode as a rectifier? Explain half-wave rectification in detail with diagrams. **(14)** **(20)**

Q. No. 8. Writer short notes on any TWO of the following: **(10 each)** **(20)**
  (a) Schrodinger equation
  (b) Linear accelerator
  (c) Cyclotron

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