COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

(AS-205) Foundation of physics

Course: B.Tech   Branch: Applied Science

Semester: Sem III

Max.Marks:60

Year: 2014-2015   Date: **0 2 DEC 2014**

                         Time : 10 to 1.00 p.m

Duration: 3 hour

Instructions: MIS No. ☐☐☐☐☐☐☐☐☐

1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

Q.1 Answer any *five* of the following (3 MARKS EACH)

A) Write a short note on 'dual nature of matter' .

B) State any three properties of central forces.

C) Write a short note on 'wave front of a light wave'

D) State and explain first law of thermodynamics.

E) Define Electric intensity '**E**' in terms of Electric potential 'V'

F) Discuss the physical significance of a wave fuction Ψ .

Q.2 Answer any *five* of the following (4 Marks Each)

A) Prove that if two exactly identical travelling waves in opposite direction interfere to each other, the resultant wave is stationary wave.

B) If $y_1 = A \cos (kx - \omega t)$ and $y_2 = A \cos (kx - \omega t + \emptyset)$ use superposition principle to find resultant of y1 and y2 and find its value for it for $\emptyset = 0$ & $\emptyset = \pi$.

C) Prove that gravitational force between two objects with masses m_1 & m_2 and with distance of separation 'r' is central in nature.

D) Find the electrostatic potential corresponding to electrostatics field $E = A\,e^{-kr}\hat{r}$

E) Explain with suitable diagram the magnetic monopole does not exists.

F) Explain Reversible and irreversible processes with suitable examples.

Q.3 Answer any _five_ of the following (5 MARKS EACH)

A) An infinite plane carries a uniform surface charge σ find it's Electric field **E**.

B) Find the magnetic field at distance 's' from a lond straight wire carrying a steady current 'I' using Biot-Savart's law.

C) Find the magnetic field at the centre of square loop which carries a steady current 'I'.Let 'R' be the distance from centre to the side.

D) Calculate the increase in entropy when 1 g of ice at -10°C is converted in to water at 0°C. (Specific heat of ice =0.5; latent heat of ice δQ=80 cal/g)

E) A Force $F = (10x + \ln x)$ acts on a particle in the direction at 30° to the positive X direction ;where F is in the newtons and x is in meter. Find the work done by this force during a displacement from $x = 1$ to $x = 2$ m.

F) Find De-broglie wavelength of an electron accelarated through potential differnece of 1000 volts.
(mass of aletron $m_e = 9.1 \times 10^{-31} kg$. planck's condtant $h = 6.62 \times 10^{-34} J \cdot S$
charge on electron $e = 1.6 \times 10^{-19} C$)

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