PBM-003-001102   Seat No. _____

B. Sc. (Sem. I) (CBCS) Examination

November / December - 2018

Physics : Paper - 101

(Mechanics, Elasticity, Electricity & Modern Physics)
(Old Course)

Faculty Code : 003
Subject Code : 001102

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instructions :

(1) All question are compulsory.

(2) Figures on right side indicates full marks.

(3) Symbols have their usual meanings.

SECTION - A

1   Write very short answer to the following questions :   **20**

(1) What is second law of Newton's ?

(2) What is work done ?

(3) Give the definition of power.

(4) What is unit of radius of gyration ?

(5) Give the definition of moment of intertia.

(6) Give the definition of Torque.

(7) Define the first law of Kepler's.

(8) What is the intensity of gravitational field at center of spherical shell ?

(9) What is stress ?

(10) Define : Newton's law of universal gravitation.

(11) Give the definition of ohm's law.

(12) Give the definition of frequency.

(13) Give the definition of phase.

(14) In Norton's network the current passing through the load remain constant with variable load.
True or False.

(15) Maximum power transfer theory applies to a.c. power only.
True or False.

(16) To check continuity of any wire which mode of multimeter should be used voltmeter.
True or False.

(17) The total energy of an atomic electron is zero.
True or False.

(18) Bohr's model can be useful for single electron only.
True or False.

(19) De - Broglie formula is $h = \lambda P$.
True or False.

(20) Group velocity and phase velocity are equal for despersive medium.
True or False.

SECTION - B

2   (a)   Write answer any three :   6
   (1)   Explain conservative force.
   (2)   State Newton's first law of motion.
   (3)   Explain the term : Gravitational Potential
   (4)   Write Keplor's first law of Planetary motion.
   (5)   State Hook's law.
   (6)   Explain Young's modulus.

   (b)   Write answer any three :   9
   (1)   State and prove work - energy theorem.
   (2)   Explain centre of mass.
   (3)   A body at rest is thrown to a height h calculate the kinetic energy and velocity when it just strikes the ground.
   (4)   Explain radius of gyration.
   (5)   State and prove perpendicular axis theorem of moment of intertia.
   (6)   Describe the state of weightlessness.

(c) Write answer any two : **10**

(1) What is collision ? Obtain expression for the final velocity of bodies which undergo elestic collision.

(2) Explain potential energy and conservation of energy.

(3) Derive an expression for moment of interia of circular disc about its diameter.

(4) What is escape velocity ? Derive its formula from surface of the earth.

(5) Define :

(i) Bulk modulus

(ii) Poisson's radio.

SECTION - C

3 (a) Write answer any three : **6**

(1) Prove $I_{rms} = \dfrac{I_m}{\sqrt{2}}$ for $I = I_m \sin \omega t$.

(2) Give the definition of phase and frequency.

(3) Explain constant current source.

(4) Explain Black-body radiation.

(5) Explain photoelectric effect.

(6) Explain De-Broglie's hypothesis.

(b) Write answer any three : **9**

(1) Explain LCR series resonance.

(2) Explain constant voltage source.

(3) Explain multimeter as a voltmeter.

(4) Explain Atomic Excitation and critical potential.

(5) Find De-Broglies wavelength for an electron accelerated by a potential difference of 2 kV, the charge on electron = 1.62×10^{-19} C, the rest mass of an electron = 9.11×10^{-31} kg.

(6) Show that an electron with kinetic energy VeV. has a wavelength of $\dfrac{1.227}{\sqrt{V}} \times 10^{-9}$ m.

(c) Write answer any two :   **10**

   (1) Describe the growth in an L-R dc circuit.

   (2) Discuss the charge of capacitor connected in series with a resistance and a d.c. source.

   (3) State and prove Thevenin's theorem.

   (4) State the correspondence principle and prove it for the frequency of spectral line.

   (5) Write short notes :

      (a) Heisenberg's uncertainity principle.

      (b) Wave mechanical atom model.

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