PRESIDENCY UNIVERSITY, KOLKATA
DEPARTMENT OF GEOLOGY
UG ADMISSION TEST 2012

MODEL QUESTION PAPER

Full Marks: 100 Time: 2 hours

1. An ideal spring with spring constant k is hung from the ceiling and a mass M is attached to its lower end. The mass is released with the spring initially unstretched. The maximum extension of the spring is-

   a) 4Mg/k b)2Mg/k c) Mg/k d) Mg/2k

2. The human heart forces 60 cc of blood at each beat against an average pressure of 12cm of mercury. If the pulse frequency is 72 per minute, calculate the power of the heart in watt. (Density of mercury is 13.6 gm/cc)

   a) 11.5 Watt b) 1.15 Watt c) 2.05 Watt d) 1.05 Watt

3. The mass of fuel carried by a rocket is 80% of the total mass. As the rocket rises, gases are ejected at a speed of 1.5 km/s. What is the maximum speed attained by the rocket? Neglect the effect of gravity.

   a) 10.5 km/s b) 1025.5 km/s c) 2.4 km/s d) 4.2 km/s

4. A spherical black body with a radius of 12 cm radiates 450 Watt power at 500 K. If the radius was halved and temperature was doubled the power radiated would be

   a) 225 Watt b) 450 Watt c) 900 Watt d) 1800 Watt

5. An air bubble under water shines due to

   a) interference b) dispersion c) total internal reflection d) diffraction

6. If a radioactive sample at any instant has its disintegration rate 5000 disintegrations per minute. After 5 minutes the rate is 1250 disintegrations per minute, then the decay constant is

   a) 0.1 ln 2 b) 0.8 ln 2 c) 0.4 ln 2 d) 0.2 ln 2

7. A real gas is most likely to approach ideal behavior at
   (a) high temperature and low pressure (b) high temperature and high pressure
   (c) high temperature and low pressure (d) standard temperature and pressure

8. How many grams of ethane (C_2H_6) gas can be contained in 11.2 L at a pressure of 10 atm and at a temperature of 136 °C?
   (a) 20 g (b) 33 g (c) 100 g (d) 66 g

9. What is the molecular geometry for SF_4?
   (a) Trigonal bipyramid (b) T-shaped (c) Square pyramid (d) Seesaw

10. What is the hybridization state of the central carbon atom of H_2CCCH_2?
   (a) sp^3 (b) sp^2 (c) sp (d) sp^3d

11. The ratio of area enclosed by the inscribed and the circumscribing circles of a square of area a^2 is
   (a)1:2 (b) 1:√2 (c)1:√2a (d) 1:1.7

12. The first term of an A.P. series is 5 and the last term is 45, if the sum of the series is 500 then what should be the number of terms?
   (a) 16 (b) 20 (c) 22 (d) 10