Answer the following long questions

1. **Define Projectile motion .Derive the relation of time of flight , range of projectile and maximum height of projectile ?**
2. **Define centripetal force ? Derive the relation of centripetal force and acceleration ?**
3. **Define artificial gravity ? Derive its relation ?**
4. **State Bernoulii`s equation ? Derive its relation ?**
5. **Write a note on Carnot heat engine ?**
6. **500 J energy is required to melt 2g of ice at 0 o C .Find the change in entropy of 70 g water at 0 o c ,if it changes into ice in a refrigerator ??**
7. **Write a comprehensive note on fardays law of electromagnetic induction ?**
8. **Define Electromagnetism .Derive the relation of force between two current carrying conductor ?**
9. **Write a note on electromotive force and maximum power output ?**
10. **A 2m long wire carrying a current of 15 A is placed in uniform magnetic field of 0.50 T .If the wire makes an angle of 60 0 with the field . Calculate the magnitude of magnetic force acting on it .**
11. Define Work ? write its condition Derive the relation of work done under variable Force ?
12. Define Solid . Write a detail note on classification of solid ?
13. A rod of 90 mm^2 has length of 3m . If a stress of 300 Mpa is applied to stretch the rod then Find the strain energy If young`s Modulus of rod is 200 G pa.
14. Define Doppler`s effect ? Derive the relation of frequency
    (a). When Source is at rest and listener is moving
    (b). When Source is moving and listener is at rest
15. Explain polarization ? Write a detail note on method of polarization ?
16. State Coulomb`s law ? Derive the relation of Vector form of coulomb`s law also Discuss superposition principle ?
17. Write postulates of special theory of relativity ? Derive the relation of Time dilation , Length contraction and mass variation ?
18. State Quarks ,Write down its different types . Also discuss change in quarks during beta decay ?
19. An Object having a net charge 24 Micro Coulomb is placed in uniform electric field of 610 N/C directed Vertically . What is the mass of object if it floats in the field ?
20. A ball of mass 100 g is released from height of 30 m . If the ball encounters an air resistance of 0.4 N ,Find the kinetic energy of ball just before striking the ground .