

Paper-IV
GENERAL ENGINEERING SCIENCE

Section-I: (Subjective)

Candidate Should attempt five questions in all.

- What do you understand by PERT and CPM? With the help of an example, differentiate between the two from the application point of view.
- Explain in detail, the procedure of preparing stress strain curve for ferrous material using appropriate m/c in a material testing lab. Your answer should clearly give name of the We testing procedure step by step, form of the raw data obtained, and procedure of covering them into stress-strain curve.
- Consider a plane wall of thickness "t" exposed to a hot fluid A having temperature T and cooler fluid B on the other side, having temperature T_B .
 - Make the appropriate sketch showing temperature variation from T_A to T_B through the wall.
 - Express the heat transfer process by resistance network. (or electric resistance analogy).
 - Write the equation for overall heat transfer coefficient (account for conduction as well as convection)
- Write the definition for "air pollution" and explain it. What are the sources of air pollution in India in general and Bihar in particular?
 - There are two measuring instruments: Vernier caliper and screw gauge.
 - Write their applications
 - Explain the procedure to find out least counts.
 - Write the working principle of energy meter.
- A student pushes a loaded sled whose mass "m" is 240 kg for a distance of 2.3 m over the frictionless surface of a frozen lake. He exerts a constant horizontal force F_x of 130N. Assume that sled starts from rest and only " F_x ", horizontal force is exerted by the student.
 - Make a free body diagram of the above situation treating sled as a particle, and represented by a dot.
 - Find the final velocity.
- Copper slug whose mass is 75 g. is heated in an oven to temperature of 312°C . The slug is then dropped into a glass beaker containing water ($m = 220\text{g}$). The effective heat capacity of the beaker is 45 cal/K. The initial temperature of the beaker is 12°C . What is the final temperature of the slug, the beaker, and the water? Make the appropriate assumption if necessary.
- (a) Fig. 1 show a series parallel circuit which involves two voltage sources. For the values of the parameters shown in the figure find the current which through $20\ \Omega$ resistor.
- (b) With the help of above example, explain Kirchhoff's current law and Kirchhoff's voltage law.