DOM (MEPC-208) Test-1

Name: **Max marks: 15**

Roll Number: **Time allotted: 50 min**

Note: *All the Questions are compulsory*

1) A shaft Y is driven by a co-axial shaft X by means of an epicyclic gear train, as shown in Fig. 1 The wheel A is keyed to X and E to Y. The wheels B and D are compound and carried on an arm F which can turn freely on the common axes of X and Y. The wheel C is fixed. If the numbers of teeth on A, B, C, D and E are respectively 20, 64, 80, 30 and 50 and the shaft X makes 600 r.p.m., determine the speed in r.p.m. and sense of rotation of the shaft Y. [5]

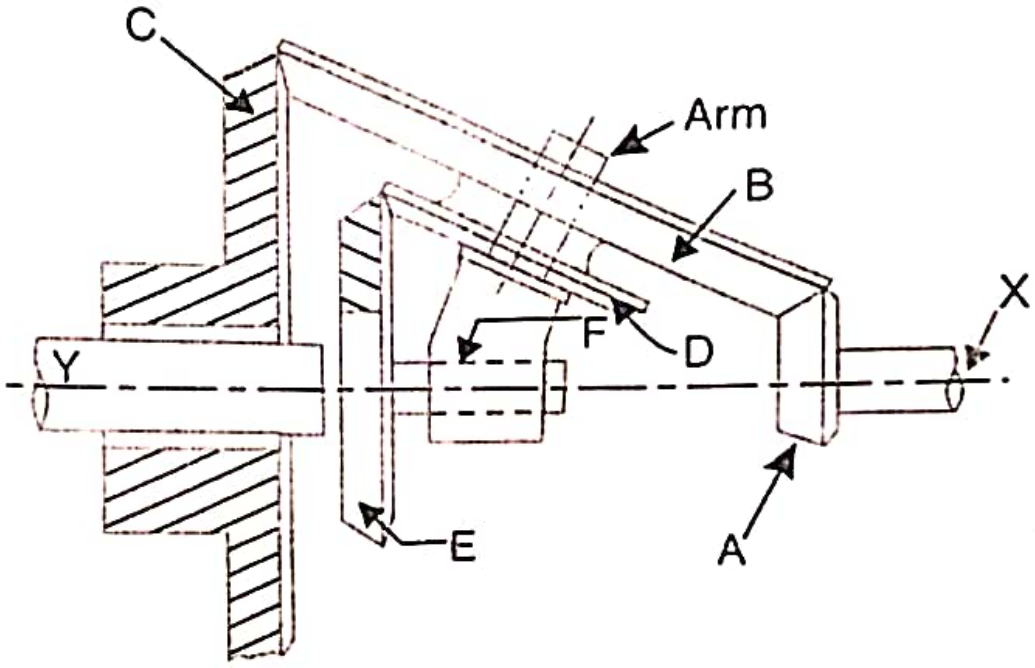

Figure 1

2) Derive an expression to find the minimum number of teeth on pinion to avoid interference in involute gears. [5]

3) Each ball of a Porter governor has a mass of 6kg and the mass of the sleeve is 40 kg. The upper arms are 300mm long and are pivoted on the axis of rotation whereas the lower arms are 250mm long and are attached to the sleeve at a distance of 40mm from the axis. Determine the equilibrium speed of the governor for a radius of rotation of 150 mm for 1% change in speed. Also, find the effort and the power for the same speed change. [5]