1.

a. What is servo assist or self-energizing? Describe various brake shoe configurations for positive and negative servo. (3 Marks)

b. Discuss in detail the components, construction and working of suspended vacuum assisted hydraulic brake system with necessary sketches. Why is suspended vacuum brake more efficient than suspended air type? (7 Marks)

2.

a. What are requirements of brake lining material? Discuss the properties, merits and demerits of various brake lining materials. (3 Marks)

b. In a hydraulic single line braking system force on foot-pedal is 80 N, pedal leverage ratio is 4, cross sectional area of master cylinder is 7.2 cm^2, cross sectional area of front pistons 32 cm^2, cross sectional area of rear piston 8 cm2, and distance moved by effort is 1.32 cm. Calculate, (7 Marks)

i. Front-to-rear brake ratio
ii. Percentage of front and rear braking
iii. Total force ratio
iv. Distance moved by output
v. Cylinder movement ratio
vi. Total movement ratio.

3.

a. Discuss why drum brake is preferred in rear wheel and disc brake in front wheels. With a neat sketch explain the construction and working of drum brake. (3 Marks)

b. What are the factors that affect stopping distance? Calculate the minimum stopping distance and brake force required for a vehicle of 1000 kg mass with ABS to be brought to rest from 80 km/h. Also calculate the stopping distance and brake force required if the brake efficiency need to be reduced to 70% due to failure of ABS system. (3 Marks)