PUNJAB PUBLIC SERVICE COMMISSION

COMBINED COMPETITIVE EXAMINATION 2017
FOR RECRUITMENT TO THE POSTS OF
PROVINCIAL MANAGEMENT SERVICE, ETC.

SUBJECT: PRINCIPLE OF ENGINEERING (PAPER-I)

TIME ALLOWED: THREE HOURS   MAXIMUM MARKS: 100

NOTE: **Attempt Any FIVE Questions In All. Calculator is Allowed (not programmable).**

Q No.1:   a) Explain in detail the Pauli Exclusion Principal and Heisenberg Uncertainty Principal.

b) What is Plank's constant? Explain its significance. Discuss Wave-Particle Duality and its applications.

(10+10 Marks)

Q No.2:   a) Differentiate between ideal and non-ideal solution. State the Boyle's law and Charles's laws.

b) Calculate the Molarity of the solution having 60 g of $Co(NO_3)_2.6H_2O$ in 4.3 L of solution.

(10+10 Marks)

Q No.3:   a) What is the difference between induction motor and synchronous motor, write down their speed and Torque relations.
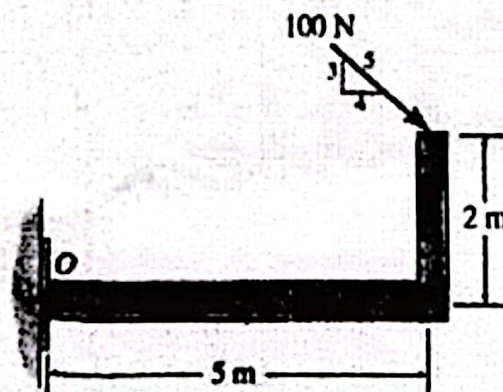
b) A 24 V permanent magnet DC motor having coil resistance of 2 ohms is developing a back emf of 22.5 volts when driving the load at normal speed. Find the value of current

(i) at startup
(ii) when the motor is running at normal speed.

(10+10 Marks)

Q No.4:   Determine the moment of 100 N force about point O in Fig.1

Fig. 1

(20 Marks)