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Class	: III Year	Semester	: VI
Topic	: Fly Wheel and Turning Moment Diagrams	Max Marks	: 50
Duration	: 50 Minutes	Date	: 01-08-13

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**Part A (Answer all Questions)**

1. What is the function of a flywheel?
2. Define coefficient of fluctuation of energy.
3. Define maximum fluctuation of energy.
4. Give four applications of flywheel.

**Part B (Answer all Questions)**

1. The turning moment diagram for a petrol engine is drawn to a scale of 1mm to 6N m and the horizontal scale of 1mm to 1°. The turning moment repeat itself after every half revolution of the engine. The area above and below the mean torque line are 305, 710, 50,350,980 and 275mm<sup>2</sup>. The mass of rotating parts is 40kg and a radius of gyration of 140mm. Calculate the coefficient of fluctuation of speed if the mean speed is 1500rpm.
2. The intercepted areas between the output torque curve and the mean resistance line of a turning moment diagram for a multi cylinder engine, taken in order from one end are as follows:-0.35,4.10,-2.85,3.25,-3.35,2.60,-3.65,2.85,-2.6 sq cm. The diagram drawn into a scale of 1cm=700Nm and 1cm = 45°. The engine speed is 900rpm and the fluctuation of speed is not to exceed 2% of the mean speed. Find the suitable diameter and cross section of the flywheel rim if the safe centrifugal stress is limited to 7MPa. The density of the material is 7200kg/m<sup>3</sup>. The rim is rectangular with the width 2 times the thickness. Neglect the effect of arms.
3. The turning moment diagram for a petrol engine is drawn to a scale of 1mm to 500N m and the horizontal scale of 1mm to 3°. The turning moment repeat itself after every half revolution of the engine. The area above and below the mean torque line are 260,-580, 80, -380,870 and -250mm<sup>2</sup>. The mass of rotating parts is 55kg and a radius of gyration of 2.1m. Calculate the coefficient of fluctuation of speed if the mean speed is 1600rpm.
4. The engine is running at a speed of 480rpm. The intercepted areas between the output torque curve and the mean resistance line of a turning moment diagram for a multi cylinder engine, taken in order from one end are as follows 1.1,-1.32,1.53,-1.66,1.97,-1.62sq cm. Design the flywheel if the total fluctuation of speed is not to exceed 10rpm and the centrifugal stress in the rim is  $5 \times 10^5$  N/m<sup>2</sup>. You may assume the breadth is approximately 2.5 times of the thickness and 90% of the Moment of Inertia is due to the rim. The density of the material is 7250 kg/m<sup>3</sup>.