ENGINEERING MECHANICS

Time : 3.00 Hours] **[Maximum Marks : 60**

[Minimum Mark 20

NOTES :

i) Attempt all questions.

ii) Students are advised to specially check the Numerical Data of question paper in both versions. If there is any difference in Hindi Translation of any question, the students should answer the question according to the English version.

iii) **Use of Pager and Mobile Phone by the students is not allowed.**

Q 1) Answer any <u>two</u> of the following : [2×5=10

a) Explain the term effort, velocity ratio, efficiency and M.A of a machine.

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Q 1) Answer any <u>two</u> of the following : [2×5=10]

a) Explain the term effort, velocity ratio, efficiency and M.A of a machine.
b) Briefly explain friction and its types.
c) Explain Varignon theorem with diagram and write its applications.

Q 2) Answer any <u>two</u> of the following : [2×5=10]

NOTES :

i) सभी प्रशन अनिवार्य है।

ii) परीक्षार्थियों को सलाह दी जाती है कि वे प्रश्न-पत्र के दोनों अनुवादों में सांख्यकीय अंको का विशेष रूप से मिलान कर लें। यदि हिन्दी अनुवाद के किसी प्रश्न में किसी प्रकार की भित्रता है, तो परीक्षार्थी अंग्रेजी अनुवाद के अनुसार प्रश्न का उत्तर दें।

iii) विद्यार्थियों को पेजर और मोबाइल फोन के उपयोग की अनुमति नहीं है।

(हिन्दी अनुवाद)

प्र. 1) निम्नलिखित में से किन्हीं दो का उत्तर दीजिए। **[2×5=1**

अ) मशीन के प्रयास, वेग अनुपात दक्षता और यांत्रिक लाभ की व्याख्या कीजिए।

ब) घर्षण और उसके प्रकारों को संक्षेप में समझाइए।

स) वैरिग्नन प्रमेय को चित्र के साथ समझाएं और इसके अनुप्रयोग लिखिए।

प्र. 2) निम्नलिखित में से किन्हीं दो का उत्तर दीजिए। **[2×5=10]**

[Minimum Marks : 17

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Q1) Answer any two parts of question. **[2 × 5 = 10]**

a) Define the term Applied Mechanics? Explain different applications of applied mechanics.

b) i) What do you understand by Rigid Body? Explain.

ii) Differentiate between scalar and vector quantity with example.

c) What do you mean by dimensional homogeneity? Explain with suitable example.

Q2) Answer any two parts of question. **[2 × 5 = 10]**

a) What are the different laws of motion? Explain with suitable example.

b) What are the various types of forces? Define parallelogram law of forces, explain.

c) A particle is acted upon by two forces 100 N and F N, the included angle being 30°. If the resultant of these two forces is 193 N, find the magnitude of F and the direction of the resultant.

Q3) Answer any two parts of question. **[2 × 5 = 10]**

a) Explain Varignon's theorem and it's applications.

b) i) Explain the difference between term moment and couple, with suitable examples.

ii) What do you mean by free body diagram, explain?

c) Explain coplanar, concurrent force system and coplanar, non-concurrent force system with the help of a diagram.

Q4) Answer any two parts of question. **[2 × 5 = 10]**

a) What do you mean the by the Term Friction? Name different types of friction.

b) Define laws of static friction, and explain with example.

c) How will you determine the centre of gravity of a solid body. Explain to get the centre of gravity of a cone.

Q5) Answer any two parts of question. **[2 × 5 = 10]**

a) Explain the term effort, velocity ratio and mechanical advantage of a machine.

b) Derive the condition for minimum force required to slide a body on a rough horizontal plane.

c) Find out the ractions of simply supported beam when a point load of 1000 kg is acting at the centre. The UDL of 200 kg/m is acting on right half of the beam. The length of the beam is 6m.