F.Y.B.SC. SEM – I (CBCS - 2016 COURSE) : SUMMER - 2018

SUBJECT: PHYSICS : MECHANICS & PROPERTIES OF MATTER

Day: **Wednesday** Time: **11.00 A.M. TO 02.00 PM**

Date: **18/04/2018** **S-2018-0620** Max. Marks: 60

N.B:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Use of electronic calculator is allowed.

Q.1 A) Select correct alternative for the following questions : **(06)**

1) Hook's law is given by _____.

a) stress = strain **b)** stress ≠ strain **c)** stress α strain

d) stress $\alpha \frac{1}{\text{strain}}$.

2) _____ is the property of fluids.

a) ductility **b)** viscosity **c)** elasticity **d)** gravity

3) Newtons 3rd law states that _____.

a) $f_1 = f_2$ **b)** $f_1 \neq f_2$ **c)** $f_1 = -f_2$ **d)** $f_1 < f_2$

4) Change in volume per unit original volume is called as _____

a) volume strain **b)** volume stress **c)** longitudinal stress **d)** longitudinal strain

5) The work done by a force acting on the body is equal to _____.

a) k_f / k_i **b)** $k_i + k_f$ **c)** $k_f - k_i$ **d)** $k_i \times k_f$

6) If the particle moves perpendicular direction to the force then total work done is equal to _____.

a) one **b)** two **c)** zero **d)** three

B) Answer the following in **ONE** sentence : **(06)**

1) Define surface tension?
2) What is viscosity?
3) Define the term elasticity?
4) What is Young modulus?
5) State Newton's 3rd law of motion.
6) State different types of energies?

Q.2 Attempt any **THREE** of the following: **(12)**

a) Explain stress, strain. Obtain relation between them.

b) A metal wire of 10 m length extends through 1 cm when a force 45 N is applied to it. What force is required to elongate the wire to 1.2 cm?

c) Find the work done in a moving particle from $\bar{r}_1 = (5\bar{i} - 2\bar{j} + 7\bar{k})$ to $\bar{r}_2 = (10\bar{i} + 2\bar{j} + 14\bar{k})$ metre, if the applied force is $\bar{f} = (\bar{i} + 3\bar{j} + 2\bar{k})$ Newton.

d) Derive an expression for Torsional oscillation.

P.T.O.

Q.3 Attempt any **FOUR** of the following: **(12)**

a) Explain bending of beams in detail.

b) Explain work - energy theorem.

c) Explain Jaeger's method in brief

d) Write a note on coefficient of viscosity.

e) Explain inertial and non inertial frame of references

Q.4 Attempt any **TWO** of the following: **(12)**

a) Define conservative force and show that the work done around round trip is zero.

b) Write note on Reynold's number.

c) Explain Newton's 1^{st} and 2^{nd} law of motion and with suitable examples.

Q.5 Attempt any **TWO** of the following: **(12)**

a) State and explain the work done by constant force.

b) Explain the terms Young's modulus, bulk modulus and modulus of rigidity.

c) **i)** In pitot tube experiment, the height difference in two vertical tubes is 3 cm. If the diameter of horizontal tube is 2 cm, what is the rate of flow of liquid?

ii) If for a given substance $Y = 2 \times 10^{11}$ N/m^2 and $\eta = 4.9 \times 10^{11}$ N/m^2; calculate the bulk modulus K.

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