

Total No. of Pages 1

Roll No.

FOURTH SEMESTER

B.E. (PE)

MID SEM EXAMINATION

March

2007

PE-211 FLUID SYSTEMS

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer ALL questions.

Assume suitable missing data, if any.

- 1 Define viscosity and discuss the causes of viscosity in liquids and gases. 2
- 2 A trapezoidal thrust bearing with maximum and minimum radius of 150 mm and 100 mm is fitted with a pump. The length of the bearing is 150 mm. The gap between shaft and bearing is 0.1 mm and filled with oil of viscosity 2.25×10^{-3} Ns/m². The shaft is rotating at 3000 rpm. Calculate power loss due to friction. 5
- 3 Derive continuity equation in a three dimensional flow. 3
- 4 Write the conditions for stable, unstable and neutral equilibrium of floating and submerged body. 2
- 5 Show that constant stream function lines and constant velocity potential lines are perpendicular to each other. 3
- 6 An open cylindrical tank is spun at 110 rev/min with its axis vertical. The tank is 0.9 m high and 0.5 m diameter and is filled completely with water before spinning. Calculate the water left in the tank when it reached to full speed and slope of water surface at a point where it meets the rim of the tank. 5

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FOURTH SEMESTER

B.E. (PE)

MID SEM EXAMINATION

March

2007

PE-212 MECHANICS OF SOLIDS

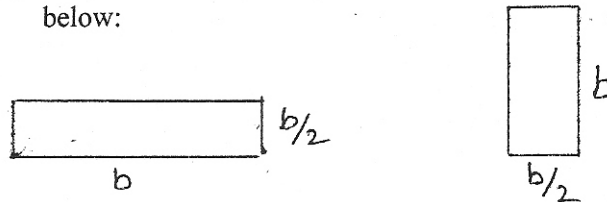
Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer any **TWO** questions.

Assume suitable missing data, if any.

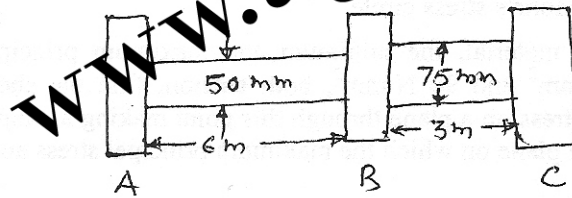
- 1[a] Draw and describe Mohr's stress circle. 3
- [b] If, at a point in a material, the minimum and maximum principal stresses are 30 N/mm^2 and 90 N/mm^2 , both tension, find the shear stress and normal stress on a plane through this point making an angle of $\tan^{-1}0.25$ with the plane on which the maximum principal stress acts. 4
- [c] Explain bending stresses and show why channel sections are used in beams? 3
- 2[a] What is pre-stressing of concrete beams? 2.5
- [b] Discuss the importance of point of contraflexure in beams. 2.5
- [c] a uniformly distributed load of 1.5 kN/m is loaded on simply supported beam of 15 m length. There are two concentrated loads of 4 kN and 5 kN at 10 m and 5 m from right hand support. Find the maximum B.M. and position. Draw the S.F. and B.M diagrams. 5
- 3[a] A beam cross-section is used in two orientation as shown in fig. given below:



Calculate the maximum bending stresses for the same bending moments applied in both cases. 2.5

[b] A steel plate 5 cm wide and 1 cm thick is to be bent into a circular arc of radius 10 m. If $E = 2 \times 10^6 \text{ kg/cm}^2$, then calculate the maximum stress induced in the material. 2.5

[c] A steel shaft shown in following fig. rotates at 180 r.p.m with 60 KW taken off at A and 30 KW removed at B and 90 KW applied at C. Determine the maximum shear stress and angle of twist between A to C. Take $G = 80 \times 10^9 \text{ N/m}^2$. 5



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FOURTH SEMESTER

B.E. (PE)

MID SEM EXAMINATION

March 2007

PE-213 MANUFACTURING MACHINES

Time: 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer ALL questions.

Assume suitable missing data, if any.

- 1[a] Explain orthogonal and oblique cutting process. 1
- [b] Explain with the help of neat sketch, the complete geometry of a single point cutting tool. 2
- [c] During straight turning of a 25 mm diameter steel bar at 300 rpm with a HSS tool, a tool life of 10 min was obtained. When the same bar was turned at 250 rpm, the tool life increased to 52.5 min. What will be the tool life at a speed of 275 rpm. 2
- 2[a] Sketch and explain the different types of work holding devices for a lathe machine. 3
- [b] Explain how the sliding friction is converted into rolling friction in a CNC lathe. 2
- 3[a] With the help of suitable diagram, explain the relative merits and demerits of open and closed loop control system, and absolute and incremental dimensioning. 3
- [b] Describe a Adaptive control machine with a neat sketch. 2
- 4 Describe a broach with the help of neat sketches and explain the function of RPT in the broach. 5

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B.E. (PE)

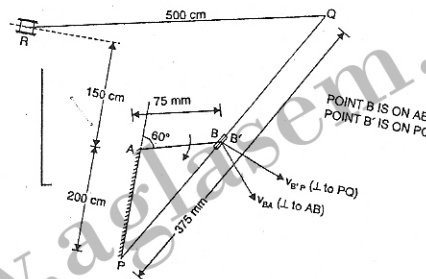
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Max. Marks : 20

Assume suitable missing data, if any.

- 10



- 2 Define the following :
- [a] pressure angle and cam angle of cam
 - [b] binary and quaternary links
 - [c] Grubler's criterion
 - [d] Degree of freedom for screw-jack and spherical pair. 4
- 3 Draw displacement, velocity and acceleration curve to a knife edge follower having
- [a] outward cycloidal motion of 40 mm for 60° of cam rotation
 - [b] dwell for next 45°
 - [c] return to its original position during next 90° with SHM.
- The cam rotates with 300 rpm. 6

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FOURTH SEMESTER

B.E. (ME/PE)

MID SEM EXAMINATION

March

2007

ME/PE-215 ELECTRONICS

Time: 1 Hour 30 Minutes

Max. Marks : 20

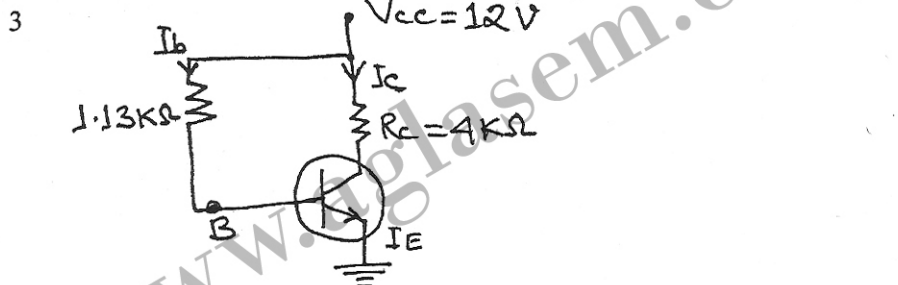
Note : Answer ALL questions.

Assume suitable missing data, if any.

- 1 What is zener effect? Explain the function of a zener diode and draw its characteristics. Explain how a zener diode is used as a voltage regulator. 4

- 2[a] Explain the working of a bridge rectifier. 2

- [b] Explain static and Dynamic Resistance of diode. 2



In the figure above, Si transistor with $\beta = 100$ is used for fixed biasing. Determine (i) Base current (ii) Collector current, (ii) V_c , V_B and V_{CB} (iv) Operating point. 4

- 4[a] Explain with the help of a diagram Q-point and load lines. 2

- [b] For a transistor, collector current is 6.25 mA and the base current is 100 μ A. The collector to base leakage current is 5 μ A. Determine the emitter current and α_{DC} . 2

- 5 Write short notes on any TWO of the followings:

[a] Clipper circuit

[b] Avalanche and zener breakdown

[c] Intrinsic and Extrinsic semiconductor

[d] Ripple factor. 4