Set - Q
2013-14
Mech.

AIKTC, School of Engineering & Technology

UNIT TEST 1 FEB 2014

SE- All Branches Sem IV (CBSGS) Applied Maths IV

Q.1 a) Prove that Eigen values of a Hermitian matrix are real numbers. (12)

b) $A = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix}$ Find the Eigen values and Eigen vectors for $A^3 + 5A + 8I$.

c) $A = \begin{pmatrix} \pi & \pi/4 \\ 0 & \pi/2 \end{pmatrix}$ Find cos A

Q.2) Given $A = \begin{bmatrix} 2 & 1 & 1 \\ 2 & 3 & 2 \\ 3 & 3 & 4 \end{bmatrix}$ (8)

a) Find Eigen values and eigen vectors of A.

b) Is A Diagonable? Explain.

c) Is A derogatory ? Explain.

OR

Q.2) Given $A = \begin{bmatrix} 1 & -2 & 0 \\ 1 & 2 & 2 \\ 1 & 2 & 3 \end{bmatrix}$ (8)

a) Find Eigen values and Eigen vectors of A.

b) Is A Diagonable? Explain.

c) Is A Derogatory ? Explain.

Symbol of Secularism & National Integration

2013-14

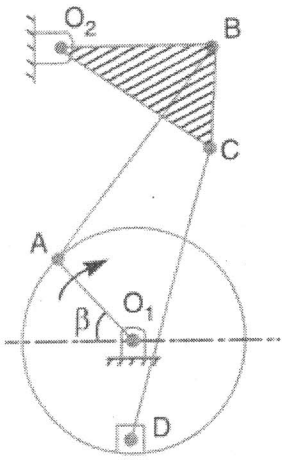
ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

School of Engineering & Technology

Subject:TOM-I | **Date: 21-02-14**
Marks: 20 | **Duration: 1:15**
Class: S.E. M.E. Sem IV UT-I | **Branch: Mechanical**

All the Questions are compulsory and carry equal marks.

1) Figure shows a sewing needle bar mechanism O1ABO2CD wherein the different dimensions are as follows:
Crank O_1A = 16 mm; < β = 45°; Vertical distance between O_1 and O_2 = 40 mm; Horizontal distance between O_1 and O_2 = 13 mm; O_2 B = 23 mm; AB = 35 mm; < O_2 BC = 90°; BC = 16 mm; CD = 40 mm. D lies vertically below O_1.Find the velocity of needle at D for the given configuration. The crank O_1A rotates at 400 r.p.m.
[Marks 10]



2) Attempt **Any two** of the following questions. **[Marks 10]**
i) What is meant by inversion of a mechanism? Name the inversions of 4 bar chain mechanism and explain any one.
ii) Explain Peaucellier's Mechanism.
iii) What is the condition of correct steering? State and Derive.
iv) Explain the types of kinematic pairs.

----------*Best of Luck*----------

2013-14

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

School of Engineering & Technology

Subject: Fluid Mechanics | **Date: 20/02/2014**
Marks: 20 Marks | **Duration: 1 hr**
Class: S.E Sem IV UT - I | **Branch: Mechanical**

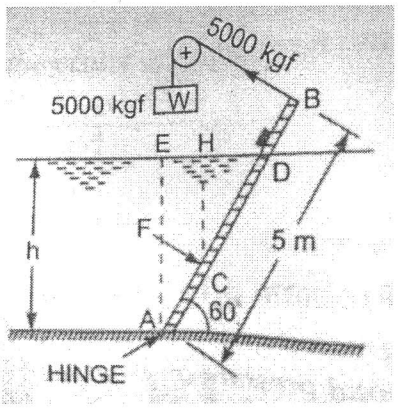
Note : All questions are Compulsory

Q.1 Define the Following (Any Four) **(2*4 = 08 Marks)**

(a) Specific Gravity
(b) Mass Density
(c) Specific Volume
(d) Newtons Law of Viscosity
(e) Surface Tension

Q.2 Solve the Following **(8 Marks)**

A Rectangular gate 5mx2m is hinged at its base and inclined at 60 degrees to the horizontal as shown in Fig. To keep the gate in stable position, a counter weight of 5000 kgf is attached at the upper end of the gate. Find the depth of water at which gate begins to fall. Neglect weight of the gate.



Q.3 Solve the Following **(4 Marks)**

The space between two square flat parallel plates is filled with oil. Each side of the plate is 720mm. The thickness of the oil film is 15mm. The upper plate moves with velocity of 3m/s and requires a force of 120N to maintain the speed. Determine (i) The dynamic Viscosity of the oil (ii) The kinematic viscosity of oil if the specific gravity is 0.95.

-----BEST OF LUCK-----

2013-14

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

Symbol of Secularism & National Integration

School of Engineering & Technology

Subject: Material Technology	**Date: 22/02/14**
Marks: 20	**Duration: 1 Hr.**
Class: SE (IV) UT - I	**Branch: ME**

Q.1 Attempt any two of the following. [2x8=16]

1. Give a brief Classification of Materials with examples (at least one), properties and applications of each type.
2. What are different types of dislocations observed in materials? Explain in detail.
3. Derive an expression for the critically resolved shear stress in a single crystal subjected to tensile load.

Q.2 Answer in a single line. [1x4=4]

1. Why the force required for plastic deformation of a polycrystalline material is more than that required for single crystal.
2. No. of slip systems in 'K' are 24 and that for 'W' are 12. Which material is more ductile and why?
3. "The burger vector in case of an edge dislocation is _____(Parallel/Perpendicular) to direction of dislocation while for screw dislocation it is_____(Parallel/Perpendicular)". Fill the correct option.
4. Out of Twining and Slip, which is the most predominant mechanism of deformation?

2013-14

Symbol of Secularism & National Integration

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

School of Engineering & Technology

Re-test

Subject: Production Processes-I
Marks: 20
Class: Sem III

Date: 01/3/2014.
Duration: 1 hour
Branch: Mechanical Engg

UT-I

Instructions:

1. Draw neat sketches to support your answer wherever necessary.
2. Attempt any four of the five questions.
3. All questions carry equal marks.

1. Distinguish between Destructive and Non-Destructive Testing.
2. Describe the process of Stretch Forming.
3. Classify various Casting Processes.
4. How do you produce plastic water bottles with blow moulding?
5. Distinguish between hot working and cold working processes?

ME

2013-14

Symbol of Secularism & National Integration

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

School of Engineering & Technology

Subject: Production Processes-II UNIT TEST-I **Date:** 21/2/2014.
Marks: 20 **Duration:** 1 hour
Class: Sem IV **Branch:** Mechanical Engg.

Instructions:

1. Draw neat sketches to support your answer wherever necessary.
2. Attempt any four of the five questions.
3. All questions carry equal marks.

1. Distinguish between General Purpose Machines and Special Purpose Machines.
2. What are the functions of a cutting fluid?
3. State the properties of cutting tool materials.
4. What are the pre-requisites of a machine tool?
5. Distinguish between Job Production, Batch Production and Mass Production on the basis of any five unique points.

2013-14

Symbol of Secularism & National Integration

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL
School of Engineering & Technology

Subject: IE | **Date: / 02 / 2014**
Marks: 30 | **Duration: 1-Hr/s**
Class: SE Sem IV U.P. I | **Branch: Mechanical Engg.**

Q .1) Solve any Five out of following. 10 M

A) Draw V-I characteristics of SCR. 2M
B) Draw R and R-C firing circuit of SCR. 2M
C) Draw V-I characteristics of DIAC. 2M
D) Draw V-I characteristics of TRIAC. 2M
E) Draw TRIAC – DIAC circuit application. 2M
F) Draw GTO structure in details (Constructional details). 2M
G) State various type of Turning off Methods SCR. 2M

Q .2) Solve any ONE out of TWO. 5 M

A) Draw and explain Full wave controlled rectifier with R load. 5M
B) Comparison between MOSFET & IGBT 5M

Q .3) Solve any ONE out of TWO. 5 M

A) Comparison between power BJT & MOSFET 5M
B) Explain basic principle of single phase & three phase bridge inverter. 5M

2013-14

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

Symbol of Secularism & National Integration

School of Engineering & Technology

Subject: Material Technology
Marks: 20
Class: SE (IV) UT - I

Date: 22/02/14
Duration: 1 Hr.
Branch: ME

Q.1 Attempt any two of the following. [2x8=16]

1. Give a brief Classification of Materials with examples (at least one), properties and applications of each type.
2. What are different types of dislocations observed in materials? Explain in detail.
3. Derive an expression for the critically resolved shear stress in a single crystal subjected to tensile load.

Q.2 Answer in a single line. [1x4=4]

1. Why the force required for plastic deformation of a polycrystalline material is more than that required for single crystal.
2. No. of slip systems in 'K' are 24 and that for 'W' are 12. Which material is more ductile and why?
3. "The burger vector in case of an edge dislocation is _____(Parallel/Perpendicular) to direction of dislocation while for screw dislocation it is_____(Parallel/Perpendicular)".
   Fill the correct option.
4. Out of Twining and Slip, which is the most predominant mechanism of deformation?