جـــمهوريـــة الــــعـــــراق

وزارة التعليم العالي و البحث العلمي

جامعة الفرات الأوســط التقنية

الكلية التقنية الهندسية / النجف

قسم هندسة تقنيات السيارات

المرحلة الرابعة

أسئلة الامتحان النهائي للعام الدراسي

2015-2016

الدور الأول

شعبة ضمان الجودة و الأداء الجامعي

ATU University

Technical College Engineering - Annajaf

Dep. : Automotive Eng. Techniques

Grade Level: 4th.

Object: Computer Application (CAD/CAM).

Exam Time: 3 hours.

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Note: Attempt All Questions

CAD Applications (MasterCAM X5) (60 Marks):

Q1: What are the procedures for preparing the graphic area in MasterCAM X5 program.

(30 Marks)

Q2: Draw the following structure in the figure (1) by using the commands: (30 Marks)
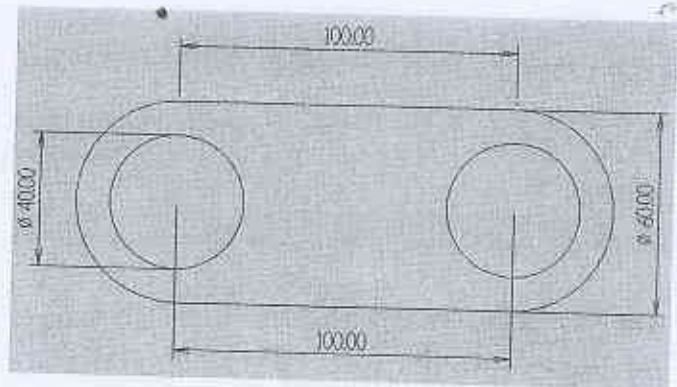1) line.   2) Arc.   3) circle.

Figure (1) Multi-pin holes tutorial

CAM Applications (40 Marks):

Q1: The figure (1) indicates to cylindrical stainless steel rod with length (l =150 mm), diameter (D_o = 12 mm) is being reduced in diameter to (D_f =11 mm) by turning on a lathe. The spindle rotates at (N = 400 rpm), and the tool is travelling at an axial speed of (U=200 mm/min). Calculate:

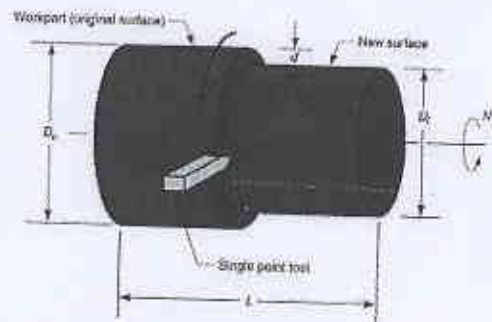a. The cutting speed C.S (maximum and minimum).

b. The material removal rate (MRR).

c. The cutting time (t).   d. The power required if the unit power is estimated to (4 w.s/mm³).

Figure (1) Cylindrical rod turning

(20 Marks)

****

Q2: Comparative between the following functions in CNC-Turning machine: **(20 Marks)**

(1) G90 & G91

(2) M00 & M30

(3) G21 & G20

(4) M03 & M04

GOOD LUCK

Examiner
A.Lecturer: Mohammed. A. Abass

Head of Dep.
Dr. Haider H. Al-Abdili

Subject: Advanced Automotive Technology	Ministry of Higher Education and Scientific Research	
Time: 3 hours	Al-Furat Al-Awsat Technical University	Date: /5/2016
Class: 4th	Engineering Technical College / Najaf	
	Final Exam 2015-2016	

Note : Answer five questions only

Q1. Define five only: (20 marks)

1- stratified charge   2- AMT   3- valve overlap   4- blind spot

5- regenerative braking   6- wheel speed sensor

Q.2 Choose the correct answer (20 marks)

1- A collision avoidance system uses ………….. to detect a vehicle or another object in front of the vehicle.

a) G-sensor   b) siren   c) radar   d) light

2- A combustion chamber with the displacement of 900 cc and 100 cc in the clearance volume has a compression ratio of ………

a) 8:1   b) 11:1   c) 9:1   d) 10:1

3- The frequency of the signal from the skidding tires is ……….. the frequency from the tires that are rotating on dry pavement in ABS.

a) lower than   b) higher than   c) same   d) double

4- Most of the small hybrid vehicle components are combined in the integrated power unit (IPU) which located ………………

a) in the engine compartment   b) behind the rear seats

c) under the steering wheel   d) under the roof of the vehicle

5- For highway driving, the car can be lowered to …………………..

a) improve aerodynamics   b) improve the visibility

c) enhance the damping   d) enhance the efficiency of break system

Q.3/A/ What are the benefits of CVT ?	8 M
Q.3/B/ How the Valve Timing Control (VTC) System work ?	12 M
Q.4/A/ Explain the operation of Lane departure warning system	10 M
Q.4/B/ Explain the operation of Hybrid Electric Vehicle (HEV)	10 M
Q.5/A/ What are the differences between compression ratio and pressure ratio?	5 M
Q.5/B/ What are the components of Traction Control System?	8 M
Q.5/C/ What is the term Engine Downsizing means ? How it's done?	7 M
Q.6/A/ What are the components of 4WAS system ?	5 M
Q.6/B/ Compare between Transponder key and Resistance key	7 M
Q.6/C/ What are the main types of Hybrid vehicles?	8 M

Examiner   Head of Department

Ahmed Dheyaa Rabee   Dr. Haider Hasan

قسم السيارات

٤/ سم

Subject: Advanced Automotive Technology   Ministry of Higher Education and Scientific Research   Date: /5/2016

Time: 3 hours

Class: 4th

Al-Furat Al-Awsat Technical University

Engineering Technical College / Najaf

Final Exam 2015-2016

Note : Answer five questions only

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5- regenerative braking   6- wheel speed sensor

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Examiner

Ahmed Dheyaa Rabee

Head of Department

Dr. Haider Hasan

Answer all questions:

Q1\ Complete the following (Choose 5 only): **(20 Marks)**

1- There are three basic tire types ...., ..., and ....

2- Processing Aids generally consist of ...., ..., ...

3- Curing the assembled tire under heat and pressure called ....

4- .... is the most important ingredient which can alter the properties of a tire compound.

5- With rear wheel drive where the axle loadings are given as % of the vehicle weight, maximum acceleration formula is, $a_{max=}$...............

6- When the centrifugal force will equal the vehicle weight, the tyre will no longer be in loaded contact will the road surface and the velocity is then called ....

Q2\ A Sketch performance curves for undergeared and overgeared vehicles.

(10 Marks)

B** On curved banked track vehicle sliding and overturning velocities have the same expression $V = \sqrt{gr.\tan(\theta + \emptyset)}$, verify between them. **(10 Marks)

Q3** A car weighting 11772 N is being accelerated up a gradient of 1:23. Power of 56 KW is produced at 3800 r.p.m. rolling resistance is 160 N per tonne. The rolling diameter of the wheels is 0.7m and the transmission efficiency 82%, the rear axle ratio is 4.79 to 1. Determine the acceleration at the given engine speed neglecting air resistance. **(20 Marks)

Q4 A vehicle with overturning velocity V m/s and the radius is 85 m and the center of gravity of the vehicle is at a height of 0.94 m and the track of the vehicle is 1.64 m when the velocity in opposite direction was reduced to the half of the speed value. What is the angle the track be banked to enable the vehicle without overturning velocity. Where the reduction in speed was 76 Km/h.

(20 Marks)

Q5 A body of mass 10 Kg vibrates with S.H.M. of frequency 100 Hz. The total movement of the body is 4mm. Determine

(A)The velocity and acceleration when the body is 0.15mm from the extremely of it's stroke.
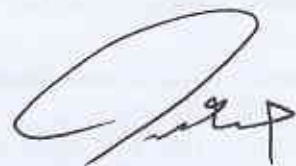
(B)the max. force acting on the body.

(C) the max. kinetic energy of the body.

(20 Marks)

Good Luck

Examiner
A.Lec. Hussein Al-Abidi

Head of Department
Dr. Hyder Hassan

Technical Collage – Najaf
**Automotive Eng. Department**
Final Examination

Subject: Machine Design II
Class: 4th Year

Time: 3 Hour
Date: /   / 2016

Q.4 The C-clamp shown in figure uses a 12 mm output diameter screw with a pitch of 4 mm. The frictional coefficient is 0.15 for both the threads and the collar. The collar has a frictional output diameter of 16 mm. The handle is made of steel with

allowable bending stress of 165 MPa. The capacity of the clamp is 700 N.
Specify the length of the handle. Use 60 N as the handle force.
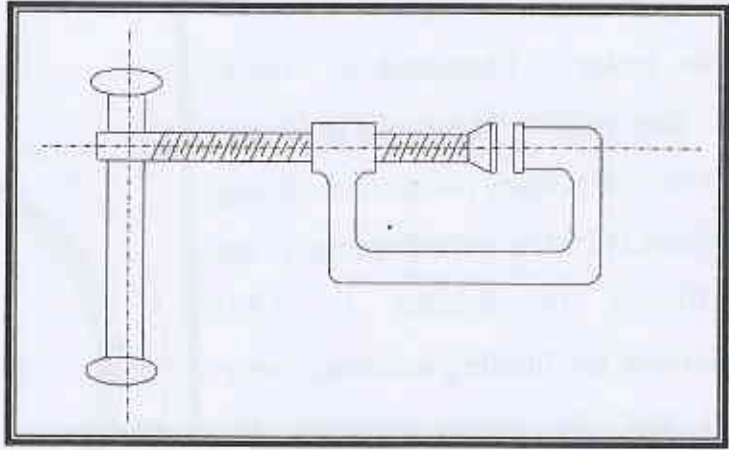
Q.5 A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure of 1.4 N/mm^2. The speed of the journal is 900 r.p.m. and the ratio of journal diameter to the diametral clearance is 1000. The bearing is lubricated with oil whose absolute viscosity at the operating temperature of 75°C may be taken as 0.011 kg/m-s. The room temperature is 35°C. Find:

1. The amount of artificial cooling required.

2. The mass of the lubricating oil required, if the difference between the outlet and inlet temperature of the oil is 10°C. Take specific heat of the oil as 1850 J / kg / C°.

Mohammed N. N.
Jan . 10 . 2016

Examiner
Mohammed N. Altemimi

Department Header
Dr. Haider Hassan

Technical Collage – Najaf
Automotive Eng. Department
Final Examination

Subject: Machine Design II
Class: 4ᵗʰ Year

Time: 3 Hour
Date: / / 2016

Notes/// 1. Answer all questions 2 Allow Using Information 3 All questions have the same marks

Q.1| A double long-shoe external drum brake is illustrated in Figure. The face width of the shoes is 50 mm and the maximum permissible lining pressure is 1 MPa on both shoes. If the coefficient of friction is 0.32, determine the limiting actuating force (Fa) and the torque capacity for anticlockwise rotation.
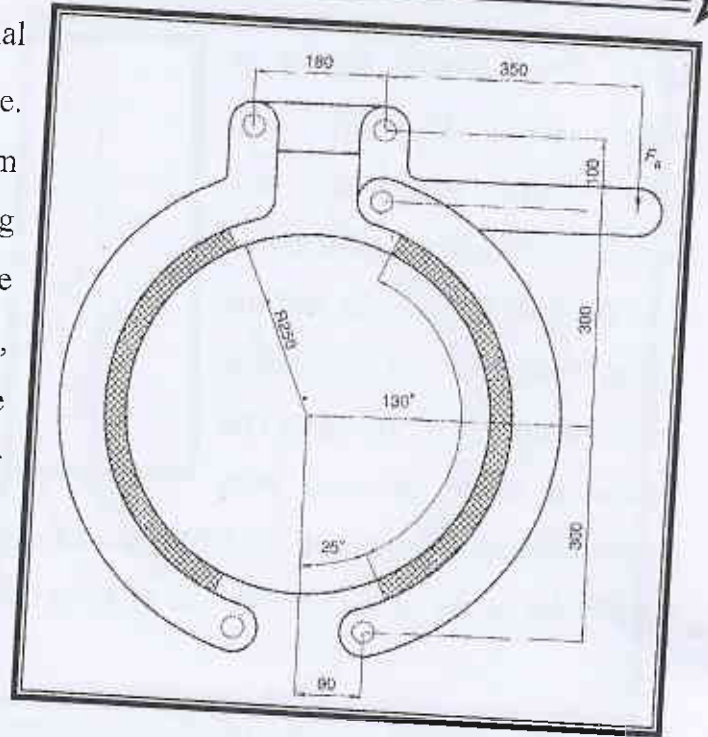
Q.2| A single cylinder internal combustion engine working on the four stroke cycle develops 75 kW at 360 r.p.m and 40 m/sec linear velocity. The fluctuation of energy can be assumed to be 0.9 times the work done per cycle. If the fluctuation of speed is not to exceed 1 per cent, estimate the mean diameter and the cross-sectional area of the rim. If the material of the rim has a density of 7200 kg / m³.

Q.3| A single plate clutch has a pair of frictional surfaces with an inside diameter of 120 mm and an outside diameter of 200 mm. The contact force generated by a system of a multi springs each one provides force of 250 N. The coefficient of friction between the friction material and the plates is 0.6. Assuming the uniform pressure approach, what number of spring are necessary to enable transmission of 15W at 1500 rev/min?

المادة: إدارة هندسية	وزارة التعليم العالي و البحث العلمي
المدرس: محمد علي ديوان	جامعة الفرات الأوسط التقنية
المرحلة: الرابعة	الكلية التقنية/ النجف
الوقت: ثلاث ساعات	قسم هندسة تقنيات السيارات والاتصالات

أسئلة الامتحان النهائي للعام الدراسي ٢٠١٥/ ٢٠١٦

ملاحظة (الاجابة عن أربعة أسئلة فقط)

س١/أ/عدد وأشرح أنواع أنظمة الانتاج (10 deg.)

ب /ماهي المؤثرات المستخدمة في الدراسة الاقتصادية للمشاريع الصناعية موضحا قوانينها بالتفصيل. (15 deg.)

س٢/ تعمل شركة عند (70%) من طاقتها التصميمية وهي (40000) وحدة سنويا وبكلفة ثابتة (220000 $) وبكلفة متغيرة (9 $) للوحدة الواحدة والايراد السنوي (448000 $) . أوجد الربح او الخسارة السنوية وحجم التعادل بالوحدات ومقدار الربح المتحقق عند (90 %) من طاقتها التصميمية . (25 deg.)

س٣/ أ/عدد واشرح كيف يتم أعداد برنامج السيطرة النوعية . (10 deg.)
ب/ ماهي انواع المواقع الصناعية وكيف يتم اختيار الموقع الصناعي . (15 deg.)

س٤/ تقدم البيانات التالية المديات والمتوسطات ل (8) عينات تشمل كل واحدة منها على (3) قياسات لمقاومة الشد لمصبوبات حديدية . علما ان قيمة (n=3) و (A=1.023) و(B= 2.575) و(C= 0) . (25 deg.)
المطلوب 1- تنظيم مخططات (X- chart) و (R- chart) .
2- ماذا تستنتج من المخططين .

No	$\bar{X}$	R
1	55.5	2.5
2	57.6	1
3	52.8	3.9
4	51.4	5.6
5	53.7	2.7
6	59.2	3.1
7	61.1	1.5
8	52.8	2.2

س٥/ ا / كيف يتم تحديد الربح او الخسارة على المخططات التالية . اشرحها بالتفصيل (10 deg.)
١ – Income – Demand Relation .
٢ – Break Even Concept .

ب / تتكون العملية الصناعية لإنتاج منتج معين من ثلاث أنشطة موضحة بالجدول التالي . أحسب الوقت القياسي لهذا العملية . (15 deg.)

النشاط	وقت مدة العمل min	أداء العامل(%)	السماحات (%)
A	0.95	105	8
B	1.25	95	7
C	3.1	110	10

(مع تمنياتنا بالموفقية والنجاح)

قسم السيارات
٤/١١

هيئة التعليم التقني	أسئلة امتحان الدور الأول للعام الدراسي	المادة :- ديناميكا المركبات
الكلية التقنية/نجف	2016-2015	السنة :-الرابعة
قسم هندسة تقنية السيارات		الممتحن:- د. تحسين علي
		الزمن :- ثلاث ساعات

Not:-Answer all Questions.

Q1-A :- Complete the following sentences   (10 marks)

1- The piston travel equation of the offset crank gear is ……….
2- The torque *(T)* of an IC engine is depends mainly on the………
3- The equation of damped frequency as a function of damped ratio(ξ) is……
4- The force amplitude ratio reaches a highest value when *(ω/ω_n)*…………
5- In the under damped free vibration, the ratio between damping constant(c) and the critical damping constant *(c_c)* is ………… .

Q1-B:-What are the unbalance force and moment remained in the in-line two cylinder IC engine, support yours answer with drawing.   (10 marks)

Q2:- Prove that the distance between the resultant of inertia force for in-line 4-cylinder reciprocating engine with crank angles *(0°, 180°, 180°, 0°)* is:-

$$a_r = \frac{3}{2} b$$

when b is the distance between the cylinders axis.   (20 marks)

Q3-:-For the two cylinder *V-engine* shown in fig. below determine the force remain unbalanced and the characteristics and direction of its resultant.   (20 marks)
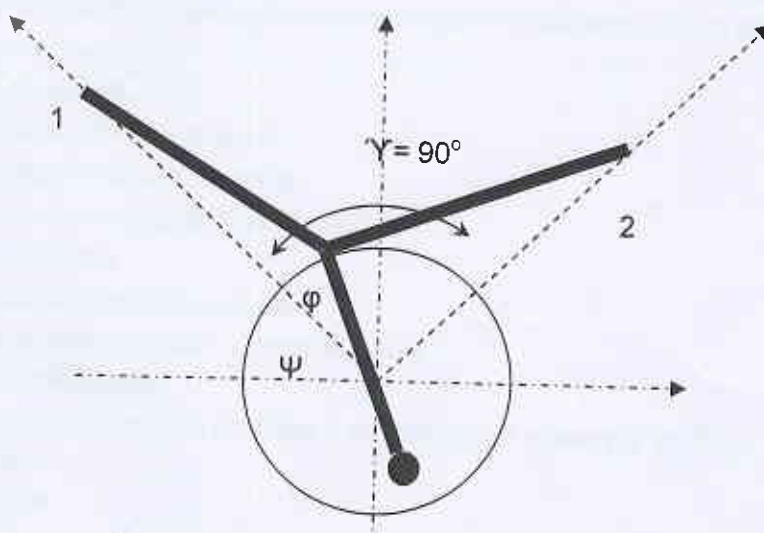
Q4:- An automobile weighting **1000 kg** it has four helical springs each one of them have **3750 N/m** stiffness the diameter of the wheels is **80 cm** reduced to **74 cm** after installation.
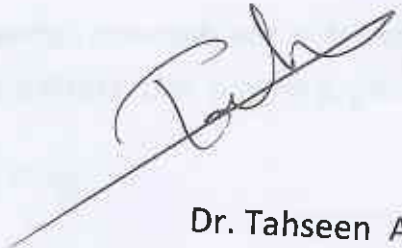
A- Find the equivalent stiffness of the vehicle springing.

B- Find the natural frequency of the system.

C- If there are four passengers arrives the vehicle what is the natural frequency becomes.(assume that each passenger have **80 kg** weight)

(20 marks)

Q5:- An automobile engine, its weight **(W=100 N)** supported with two springs each one have a stiffness **(K=1500 N/m)**, the engine rotate at **(1000 r.p.m)** primary unbalance force **(Fp = 109 N)** What is the force amplitude ratio of the system, what is the maximum amplitude of the engine?

(20 marks)

Good luck

Dr. Tahseen Ali

The Final Exam Questions for the Academic Year 2015-2016
First Round

Note: Answer Five Questions Only, and All Questions Have Same Marks.

Q1/A-List the eight-step diagnostic procedure
  B-Explain the procedures for resetting the PCM
  C- What are the functions of TP sensor computer input?

Q2/A-What mean by the road test?
  B-List input sensors and output devices
  C- List the steps of testing the ECT sensor using a scan tool

Q3/A-What are the nine modes of global (generic) OBD II?
  B-Define the term of the trip?
  C-Explain how Measuring the resistance of a spark plug wire with a multimeter.

Q4/A- List the tools and equipment used in automotive fault diagnosis
  B- What is the difference between DC coupling and AC coupling?
  C-list the steps of testing the ignition coil by using an ohmmeter

Q5/A-List the steps of testing a starter using a scan tool
  B- List the steps of testing a generator using a scan tool
  C- List the typical causes of a no-spark (intermittent spark) condition.

6/Choose the correct Answer:

1.Technician A says that the first step in the diagnostic process is to verify the problem (concern). Technician B says the second step is to perform a thorough visual inspection. Which technician is correct?
   a. Technician A only
   b. Technician B only
   c. Both Technicians A and B
   d. Neither Technician A nor B

2. Which item is a computer output device?
   a. Fuel injector
   b. Transmission shift solenoid
   c. Evaporative emission control solenoid
   d. All of the above

3. An ignition misfire or fuel mixture problem is an example of what type of DTC?
   a. Type A
   b. Type B

c. Type C

d. Type D

4. Mode $06 is the mode that checks which systems?

a. Oxygen sensors

b. Continuously monitored systems

c. Noncontinuously monitored systems

d. Current powertrain data (PIDs)

5. A meter is set to read DC volts on the 4 volt scale. The meter leads are connected at a 12 volt battery. The display will read _____.

a. 0.00

b. OL

c. 12 V

d. 0.012 V

6. An oscilloscope display is called a _____.

a. Grid

b. Graticule

c. Division

d. Box

7. Normal battery drain (parasitic drain) with a vehicle with many computer and electronic circuits is _____.

a. 20 to 30 milliamperes

b. 2 to 3 amperes

c. 150 to 300 milliamperes

d. None of the above

8. Technician A says that a pickup coil (pulse generator) can be tested with an ohmmeter. Technician B says that ignition coils can be tested with an ohmmeter. Which technician is correct?

a. Technician A only

b. Technician B only

c. Both Technicians A and B

d. Neither Technician A nor B

9. The sensor that most determines fuel delivery when a fuel-injected engine is first started is the _____.

a. O₂S

b. ECT sensor

c. Engine MAP sensor

d. IAT sensor

10. Which sensor is generally considered to be the electronic accelerator pump of a fuel-injected engine?

a. O2S

b. ECT sensor

c. Engine MAP sensor

d. TP sensor

Dhafee

Lecturer

Dr. Dhafeer M. AL-Shamkhi

Good Luck

Head of Department

Dr. Hiader H.

A-2