جـــــمهوريـــــة العـــــراق

وزارة التعليم العالي و البحث العلمي

جامعة الفرات الأوسط التقنية

الكلية التقنية الهندسية / النجف

قسم هندسة تقنيات السيارات

المرحلة الرابعة

أسئلة الفصل الأول للعام الدراسي

٢٠١٥-٢٠١٦

شعبة ضمان الجودة و الأداء الجامعي

Subject: Advanced Automotive Technology	Ministry of Higher Education	
	and Scientific Research	Date: 2 \/2/2016
Time: 2 hours	Al-Furat Al-Awsat Technical University	
Class: 4th	Engineering Technical College / Najaf	

Note : Answer all questions

Q1. Define five only: (20 marks)

1-Hybrid Vehicle   2- over steer   3- Dynamic Compression Ratio   4- homogeneous operation   5- effective diameter   6- spool time

Q2. Select the most correct answer

1- An indicator light comes on anytime the traction control system is ....

a) powered   b) activated   c) switched off   d) has a trouble

2- The carbon fibers are common in use to build structures because ....

a) easily in mass production   b) it's black color   c) light weight and density

d) high strength-to-weight ratio

3- The need of turbocharging system is to ....

a) heat up combustion chamber   b) increase intake pressure   c) speed up the intake air

d) increase oxygen molecules

4- The VEL system is more effective for .... engines.

a) SOH camshaft   b) DOH camshaft   c) heavy   d) light

5- Bosch introduced the high-tension magneto in the year ....

a) 1886   b) 1902   c) 1887   d) 1897

Q3.A/ What are the principles of anti-lock brake system?	(8M)
Q3.B/ Explain the operation and benefits of AMT.	(12M)

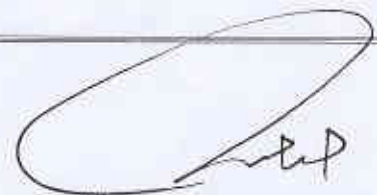|	
Q4.A/ Explain the twin charging system. What are the benefits of it?	(10M)
Q4.B/ Compare between light hybrid and full hybrid vehicles. Explain each one.	(10M)

Q5.A/ What are the main parameter should be taken to build a good structure?	(10M)
Q5.B/ Explain the cylinder deactivation and how it's done?	(10M)

Teacher
Ahmed D. Rabee

Head of Department
Dr. Hyder H. Abd

GOOD LUCK

Technical Collage – Najaf
Automotive Eng. Department
First Semester Examination
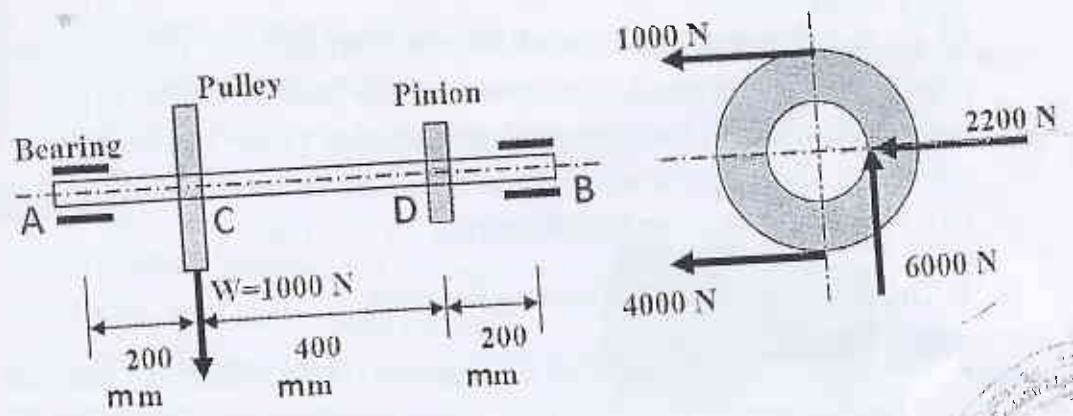
Subject: Machine Design II
Class: 4th Year

Time: 2 Hour
Date: / / 2016

Notes/// 1. Answer all questions   2. Allow Using Information.

Q.3 A pulley drive of 560 R.P.M rotational speed transmitting power to a pinion,
which in turn is transmitting power to some other machine element. Pulley
and pinion diameter are 400 mm and 200 mm respectively. A steel shaft;
structural ASTM A36 steel of 250 MPa yield strength and 400 MPa ultimate
strength; has to be designed for gradually applied load with 1.5 combined
shock and fatigue factor for bending, 2 combined shock and fatigue factor for
torsion, and 400 MPa allowable shear stress.

Design to determine the following:

1. The shaft diameter.
2. The transmitting mechanical power.
3. The safety factor of the structure.

(30 MA

Mohammed N. N.
Jan. 24. 2016

Examiner
Mohammed N. Altemimi

Department He
Dr. Haider Ha

Subject: Machine Design II
Class: 4th Year

Technical Collage – Najaf
Automotive Eng. Department
First Semester Examination

Time: 2 Hour
Date: /   / 2016

Notes/// 1. Answer all questions   2. Allow Using Information.

Q.1|

A. Drive a formula to describe the total frictional torque acting on the friction surface (clutch) considering uniform axial wear theory.

B. Drive to determine the torque required to lower a load by means of square threaded screw and its efficiency.

(40 MARKS)

Q.2| A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure of 1.4 N/mm2. 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.

(30 MARKS)

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Note: Attempt All Questions

CAD Applications (MasterCAM X5) (60 Marks):

Q1: Determine the functions of the following:

(1) Analyze.   (2) Color.   (3) Screen.   (30 Marks)

Q2: Conclude the shape resulting from drawing by using the guide commands:

((Line Endpoints LC >> Specify First Point (40,40) + Active Length 100 Mm + Active H >> Apply >> Ok >> Line Parallel LC >> Active Line 100 Mm LC + LC (Upper Direction) >> Apply >> Ok >> Specify Arc polar LC >> Specify Center Point 40,70 + Active Polar Direction Between First End Point And Second End Point + Active Radius 30 Mm >> Apply >> Ok >> Specify Center Point 140,70 + Active Polar Direction Between First End Point And Second End Point + Active Radius 30 Mm >> Apply >> Ok >> Circle Center Point (40,70) + Active Radius 20 Mm >> Apply >> Ok >> Circle Center Point (140,70) + Active Radius 20 Mm >> Apply >> Ok.))   (30 Marks)

CAM Conceptions (40 Marks):

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).
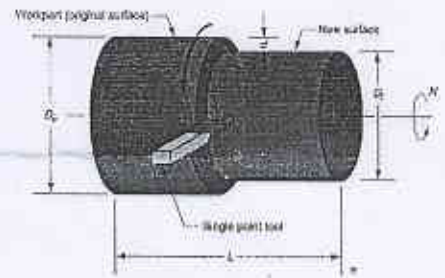

Figure (1) Cylindrical rod turning

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).

GOOD LUCK

Examiner
A.Lecturer: Mohammed. A. Abass

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

Answer all questions:

Q1\ Complete the following: (20 Marks)

1- When Tractive Effort (TE) is equal to tractive resistance (RT), a vehicle would be either .... or moving at ....

2-Pigments of a tire are divided into three groups: ...., ..., ...

3-The Sidewalls are ....

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

5-In derivation of gradient resistance, the work done along the road equal to the work done against ....

Q2\A List the major components of tires with sketch. (10 Marks)

B Sketch engine characteristics and engine speed ratios. (10 Marks)

Q3 The rolling resistance of a vehicle mass 1700Kg is 216N, and the air resistance is 372N. When the vehicle is travelling at 72 Km/h, it has a transmission efficiency of 72% with a rolling wheel diameter of 0.68m and final drive ratio of 4.73:1. Find the engine power which required to maintain the speed on a level road surface, and the increase necessary to climb a 1-in-9 gradient at a steady 20 Km/h. (20 Marks)

Q4 A car of one tonne mass , the distance between front and rear axles is 2.5m, the height of C.G. 0.75 m, reaction on rear wheel axle is 60% of the total car weight at rest, the coefficient of friction between the road surface and tire is 0.3. Determine the maximum acceleration and weight transfer when the car is driving by (a) Front wheel drive. (b) Rear wheel drive. (c) 4WD. (20 Marks)

Q5 Motorcycle is travelling on a curved horizontal road with radius of 50 m, the speed is 72 Km/h, mass of driver and motor 180 kg. What is the angle which should be inclined to save skidding and sliding. Find also the total reaction on tire. (20 Marks)

Good Luck

Examiner

A.Lec. Hussein Al-Abidi

Head of Department

Dr. Hyder Hassan

The First Semester Exam Questions for the Academic Year 2015-2016
First Semester

Note: Answer All Questions

Q1/A-List the eight-step diagnostic procedure. (11 marks)

B-List the three methods that can be used to reprogram a PCM. (3 marks)

C-List the Manufacturer's Diagnostic Routines. (6 marks)

Q2/A-List input sensors and output devices. (12 marks)

B-List the various parts of an automotive computer. (4 marks)

C-List the Four Basic Computer Functions. (4 marks)

Q3/A-Define the following terms: (8 marks)

1. Mil Condition: Off   2. Pending   3.Conflict   4.Suspend

B-What is the difference between a trip and a warm-up cycle? (8 marks)

Q4/A-What are the nine modes of global (generic) OBD II? (9 marks)

B-Why must an ohmmeter be connected to a disconnected circuit or component? (3 marks)

Q5/A- Explain how to set up and use a digital meter to read voltage, resistance, and current. (4 marks)

B-What is the difference between an oscilloscope and a graphing multimeter? (4 marks)

C- What is the difference between DC coupling and AC coupling? (4 marks)

Q6/A-Explain the purpose and function of onboard diagnosis. (10 marks)

B-What are the steps use to retrieve diagnostic information from the PCM ? (10 marks)

Good Luck

Lecturer

Dr. Dhafeer M. AL-Shamkhi

Head of Department

Dr. Hiader H.

قسم السيارات
س/٢

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الاوسط التقنية
الكلية التقنية/نجف
قسم هندسة السيارات والاتصالات

المادة: أداره هندسية
المدرس: محمد علي ديوان
المرحلة : الرابعة
الوقت :ساعتان

أسئلة الفصل الاول للعام الدراسي ٢٠١٥-٢٠١٦

ملاحظة : الإجابة على أربعه أسئلة فقط

س/١/أ /ماالمقصود بالتكاليف الصناعية؟ اذكر أنواعها وكيف يمكن تحديد نقطة التعادل.

(10 deg.)

س/١/ب/ في احد مصانع إنتاج الأجزاء الكهربائية، تكون التكاليف الثابتة 8000 ID والتكاليف المتغيرة 4 ID للوحدة سعر البيع للوحدة هو 9 ID جد حجم التعادل على شكل إيرادات ثم على شكل وحدات ثم اوجد مقدار الربح عند حجم انتاج 3000 وحده . ومقدارالربح عند حجم انتاج 1000 وحدة .

(15 deg.)

س/٢/ اذا كان عدد القطع المنتجة لشركة صناعيه عند 80% من الطاقة الإنتاجية هو 1000 قطعه بكلفه ثابته قدرها 2000 ID كلفه المواد الأولية 2 ID وكلفه القوى العاملة 6 ID للقطعة الواحدة . علما بان سعر البيع للقطعة الواحدة هو 12 ID جد .

١-الربح الكلي عند 80% من الطاقة الانتاجية . ٢-الربح الكلي عند 100%من الطاقة الانتاجية .

(25 deg)

س/٣/أ/ كيف يتم اختيار موقع المصنع وماهي الامور التي يجب مراعاتها عند اختيار الموقع .

(5 deg.)

س/٣/ب/ تمتلك الشركة العامة للصناعات الميكانيكية أربعة معامل وخمسة مهندسين وتطمح في التوصل إلى التخصيص الامثل للمهندسين على المعامل بحيث يتحقق من ذلك اكبر عائد ممكن وطبقا للبيانات التالية من العائد المتحقق شهريا بآلاف الوحدات النقدية.

(20 deg.)

معامل \ مهندسين	1	2	3	4	5
A	1	7	4	3	6
B	5	9	2	7	4
C	7	4	6	2	5
D	6	3	1	5	2

س/٤/ شركة صناعية تتكون من ثلاثة معامل قدرتها الإنتاجية اليومية (80, 160, 90) قطعة على التوالي، ومن أربعة مخازن استيعاب كل منها (D=110, C=60, B=90, A=70) قطعة على التوالي. جد اقل كلفة لنقل البضاعة من المعامل إلى المخازن، علما إن قيم كلف النقل من كل معمل إلى كل مخزن من المخازن موضحة بالجدول التالي :-

(25 deg.)

معامل \ مخازن	A	B	C	D
1	12.3	6.8	4	3
2	6.1	3.8	5.7	9.5
3	3.5	6.2	6	10

س/٥/ أ/ ماهي المقصود ب اداره الانتاج وما هي أهدافها .

(10 deg)

س/٥/ب/ ما هو النظام الانتاجي وماهي مكوناته اذكر مثالا يوضح ذلك .

(15 deg)
01/03/2016

رئيس قسم هندسة الاتصالات

رئيس قسم هندسة السيارات

مدرس المادة

المادة :- ديناميك المر?

السنة :- الرابعة سيارات

الزمن :- ساعتان

الممتحن:- د. تحسين علي

وزارة التعليم العالي والبحث العلمي

هيئة التعليم التقني

الكلية التقنية/نجف

قسم هندسة السيارات

امتحان الفصل الأول للعام الدراسي 2015 - 2016

Answer all questions.

I-A:-

What is the range of the ratio between the crank radius to the connecting rod length (λ) in practice.

What is the aim of static balance calculation?

There are three kinds of motion developed by the crank gear parts, list them only.

Discuss with sketch if we can balances the single cylinder engine.

Where we lumping the mass of balance mass and the crank pin, answer with sketch.

(10 marks)

1-B: -With the aid of sketching indicate the procedure of calculating the counterweight mass to balances the centrifugal force F_R and the moment M_R for the double crank shaft. (15 marks)

!: - Prove that the piston travel X_p as a function of the crank angle φ:-

$$X_p = R \left[(1 - \cos \varphi) + (\lambda/4)(1 - \cos 2\varphi) \right]$$

(25 marks)

I-A: - Find F_i, F_R for the engine with the following data:-

m_p =0.9 kg, m_{rod}=1.36 kg, L_{rod} 203 mm, *cg* at 50 mm from the crank pin center, φ=60°
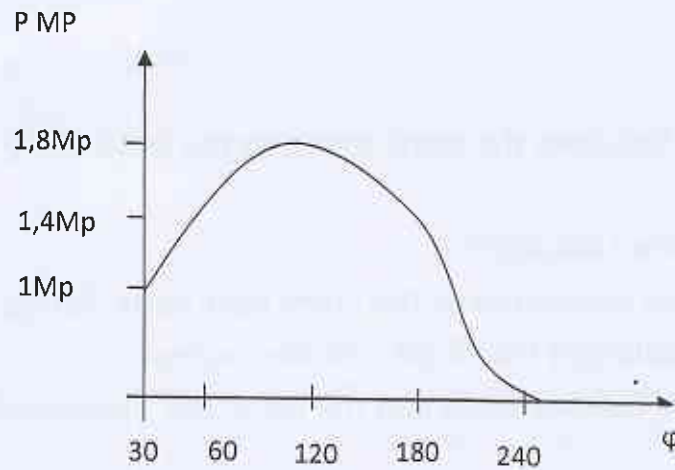
V = 3000 r.p.m, *cg* of web at 30 mm from crank shaft center.

(10 marks)

I-B: -Write the equations of the displacement, velocity, and acceleration of the offset crank gear.

(15 marks)

24-A: - Draw the torque diagram for the above engine if the cylinder bore is 85mm and the gas pressure was indicated in the following diagram: -   (15 marks)

P MP

1,8Mp

1,4Mp

1Mp

30   60   120   180   240   φ

24-B:- prove that the six cylinder engine balanced statically and dynamically .

(10 marks)

Dr. T.A.Hosain