جمهورية العراق

وزارة التعليم العالي و البحث العلمي

جامعة الفرات الأوسط التقنية

الكلية التقنية الهندسية / النجف

قسم هندسة تقنيات السيارات

المرحلة الرابعة

أسئلة الامتحان النهائي للعام الدراسي

٢٠١٥-٢٠١٦

الدور الثاني

شعبة ضمان الجودة و الأداء الجامعي

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قسم السيارات

وزارة التعليم العالي والبحث العلمي

هيئة التعليم التقني

الكلية التقنية/نجف

قسم هندسة السيارات

امتحان الدور(٢) للعام الدراسي 2015 - 2016

المادة :- ديناميك المرة

السنة :- الرابعة سيارات

الزمن :- ثلاث ساعا ت

الممتحن:- د. تحسين علي

Q1-A :- Select the suitable answer for the following points:- (10 marks)

1-When we classify the IC engine according to the fuel type we will say:-

a- Spark ignition, self-ignition, and compression ignition.
b- Four stroke, two strokes.
c- A & b.
d- Neither a, nor b.

2- The equation used to determine the piston travel of the offset crank gear is:-

a- $X_p = R[(1- \cos \varphi) + \lambda(1- \cos 2\varphi) + (k\lambda \sin\varphi)]$
b- $X_p = R[(1- \cos \varphi) + (\lambda/4)(1- \cos 2\varphi) + (k\lambda \sin\varphi)]$
c- $X_p = R[(1- \cos \varphi) + (\lambda/4)(1- \cos 2\varphi)]$
d- No one from the above equations.

3- The natural (free) vibration of a system is a vibration that occurs in the absence of:-

a- Stiffness.
b- Damping.
c- External force.
d- Acceleration.

4- The vehicle movement around the vertical axis called:-

a- Vertical vibration.
b- Yawing.
c- Longitudinal vibration.
d- Rolling.

5- The logarithmic decrement is the natural logarithmic of the ratio of:-

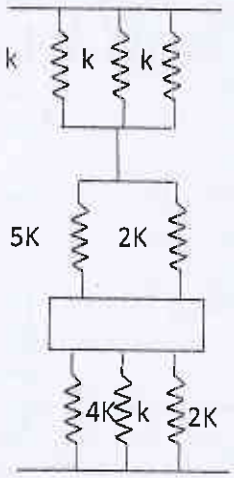
a- X_1/ X_o
b- X_2/ X_1
c- X_o/ X_1
d- No one of the above points

Q1-B:-prove that the piston acceleration (a_p) as a function of the crank angle φ:-

$$a_p = R\omega^2 [(\cos \varphi) + (\lambda)(\cos 2\varphi)]$$ (10 marks)

Q2:- A vibration system as shown in fig. below have a mass (50kg) and (k = 1000N/m),

What is the natural frequency? (20 marks)



Q3:- Find torque for the engine with 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=75 °

N = 2500 r.p.m . R=50 mm (20marks)

Q4:- The following data are given for a vibrating system with viscous damping,

f_d =2.3 Hz

K =5000 N/m

m=20 kg

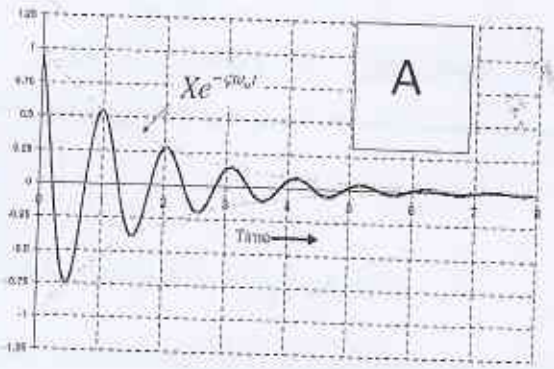
Determine the logarithmic decrement and the ratio of any two successive oscillations.

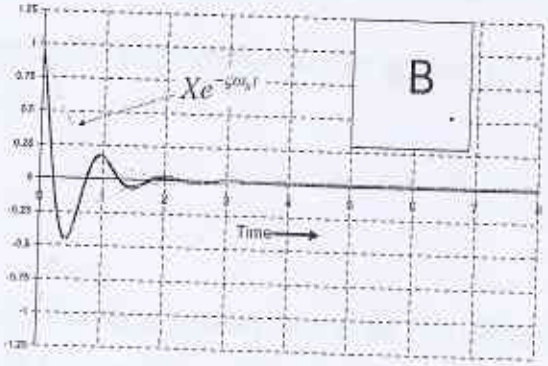
(20 marks)

Q5 :- An automobile engine test to recording the free vibration response, the engine weight is **500 kg** mounted on deferent types of foundation the recording shown in fig. below (a) and (b). Identify the following in each case

i) Logarithmic decrement in each case.
ii) The spring and damper constants.
iii) An- damped and damped frequency.

(20 marks)





Good luck

Dr. tahsean ali

د. تحسين علي

ject: Advanced Automotive Technology

Time: 3 hours

Class: 4th

Ministry of Higher Education and Scientific Research

Al-Furat Al-Awsat Technical University

Engineering Technical College / Najaf

Final Exam 2015-2016

Date: /5/2016

Note : Answer five questions only

Q1. Define **five** only: (20 marks)

1- Unsprung Weight 2- Light hybrid 3- ladder frame 4- volumetric efficiency

5- stratified charge 6- driver visibility

Q.2 Choose the correct answer (20 marks)

1- The composite materials consists of two parts: .....

a) epoxy and resin b) matrix and reinforcement

c) metallic and non-metallic d) carbon fiber and fiber glass

2- .....support the weight of the car and react to the road surface in the active suspension system.

a) air spring b) leaf spring c) hydraulic rams d) coil spring

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- An indicator light comes on anytime the ABS is .....during driving.

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

5- When a blind spot indicator comes on, it means that .....

a) the system has trouble b) there is nearby objects

c) the vehicle speed is above the allowable speed d) the vehicle is out of control

Q.3/A / What are the main Components of ABS ? 5 M

Q.3/B/ How the turbocharger work ? 8 M

Q.3/C/ What is the inductive charging (wireless charging) means ? 7 M

Q.4/A/ What are the benefits of variable valve actuation ? 7 M

Q.4/B/ How the TCS response to ***oversteer*** ? Explain. 8 M

Q.4/C/ What is the term (camless engines) means ? 5 M

Q.5/A/ What are the benefits of 4WAS system ? 8 M

Q.5/B/The distance between the pulleys does not change in CVT system. Why? 5 M

Q.5/C/ What is the functions of springs? 7 M

Q.6/A/ What are the benefits of ABS ? 8 M

Q.6/B/ What are the benefits of inter-cooler in turbocharging system? 12 M

Examiner

Ahmed Dheyaa Rabee

Head of Department

Dr. Haider Hasan

قسم السيارات
٤/ص

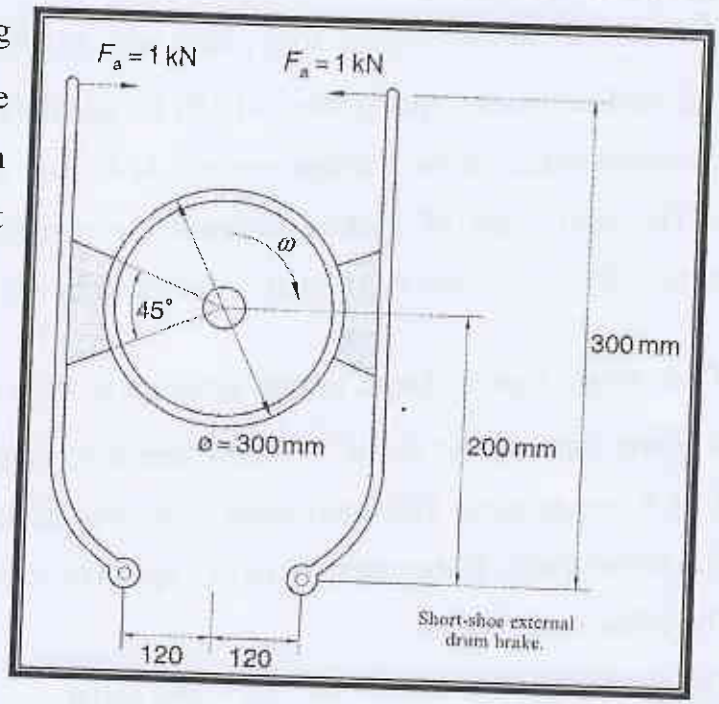
Technical Collage – Najaf
Automotive Eng. Department
Final Examination

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 The maximum actuating force on the double short-shoe external drum brake illustrated in Figure is 1 kN. If the coefficient of friction for the shoe lining is 0.3, determine the torque Capacity of the brake for clockwise rotation and check the self-locking.



Short-shoe external drum brake.

Q.2 The vertical scale of the turning moment diagram for a multi-cylinder engine working on the four stroke cycle, is 1 cm = 7000 Nm of torque, and horizontal scale is 1 cm = 30° of crank rotation. The areas (in cm^2) of the turning moment diagram above and below the mean resistance line, starting from A in and taken in order, are 0.5, +1.2, -0.95, +1.45, -0.85, +0.71, -1.06. The engine speed is 800 rpm and it is desired that the fluctuation from minimum to maximum speed should not be more than 2% of average speed, also the coefficient of fluctuation of energy not exceed than 0.15. Determine the moment of inertia of the flywheel and the mean torque may be obtained by the engine.

Technical Collage – Najaf
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Q.3| A multi-plate clutch has four plates with friction surfaces on each side. Each spring used provides a spring force of 300 N, and the assembly has six springs in it. The internal radius of the friction material is 40 mm and the external radius is 100 mm. The coefficient of friction between the materials is estimated to be 0.45. Determine the power that this clutch could transmit when running at 2400 rev/min.

Q.4| A single square thread power screw is to raise a load of 50 KN with 2600 Watt power input to the screw. A screw thread of major diameter of 34 mm and a pitch of 6 mm is used. The coefficient of friction at the thread and collar are 0.15 and 0.1 respectively. If the screw turns at a speed of 1 rev/s find:

(a) The collar mean radius.

(b) The combined efficiency of the screw and collar.

Q.5| A driving shaft is joined with coaxial driven shaft through a muff coupling. The shaft transmits 60 kW of power at 150 rpm. Design the shaft, key and muff. Assume a factor of safety of 5 with following ultimate strength values.

Ultimate shear strength for shaft = 300 N/mm^2

Ultimate shear strength for key = 200 N/mm^2

Ultimate shear strength for muff = 50 N/mm^2

Ultimate compressive strength for key = 500 N/mm^2

Mohammed N. N.
Jan. 10. 2016

Examiner
Mohammed N. Altemimi

Department Header
Dr. Haider Hassan

قسم السيارات
س/٤

وزارة التعليم العالي و البحث العلمي
جامعة الفرات الأوسط التقنية
الكلية التقنية/ النجف
قسم هندسة تقنيات السيارات والاتصالات

المادة: إدارة هندسية
المدرس: محمد علي ديوان
المرحلة: الرابعة
الوقت: ثلاث ساعات

أسئلة الامتحان النهائي الدور الاول للعام الدراسي ٢٠١٥ /٢٠١٦

ملاحظة (الاجابة عن أربعة أسئلة فقط)

س١/أ/ وضح بالتفصيل المفهوم المتكامل للسيطرة النوعية وما هي اهدافها . (10 deg.)
ب / ما المقصود بالتكاليف الصناعية وماهي انواعها . (15 deg.)

س٢/ تنتج شركة صناعية علب من حليب الاطفال ذات أوزان مختلفة تتراوح من(1/2كغم ــ 1كغم) ولغرض أحكام السيطرة على جودة المنتوج عمدت الشركة الى أحدى العينات من المنتوج للعلب ذات وزن (1كغم) حيث تحتوي العينة الواحدة على خمسة علب وكانت نتيجة الفحص كما مبين ادناه .حدد فيما اذا كانت عملية الانتاج ضمن نطاق السيطرة أو لا.علما ان قيمة (C= 0 ، B=2.115، A=0.577) (25 deg.)

عدد مرات الفحص	علبة 1	علبة 2	علبة 3	علبة 4	علبة 5
1	1.000	1.003	0.999	1.002	1.001
2	1.003	1.003	0.997	1.004	1.003
3	1.004	0.998	0.995	0.998	0.995
4	0.997	0.994	1.003	1.000	0.996

س٣/أ/ كيف يتم اختيار الموقع الصناعي . (10 deg.)
ب / ما المقصود بمناولة المواد وماهي اساسياتها ومعداتها. (15 deg.)

س٤/ جد حجم التعادل على شكل إيرادات ثم على شكل وحدات اذا كانت التكاليف الثابتة ($6000) والتكاليف المتغيرة للوحدة ($ 6) علما ان سعر البيع الوحدة هو ($ 9) ثم اوجد مقدار الربح عند حجم الانتاج (3000) وحدة ومقدار الربح عند حجم انتاج (1000) وحدة . (25 deg.)

س / ٥/ ما المقصود بالمصطلحات التالية (25 deg.)

1- Safety Margin
2- Independent Activity
3- Standard Time
4- Active Time
5- Job – order production system

(مع تمنياتنا بالموفقية والنجاح)

مدرس المادة

رئيس قسم هندسة تقنيات الاتصالات
21/09/2016

رئيس قسم هندسة تقنيات السيارات