

Programme: S.Y. B.Tech
 Academic Year: 2010-11
 Duration: 2 Hours

Semester - II

Branch: **Production**
 Date: 30.04.2011
 Max. Marks: 50

Instructions

1. Attempt Q No. 1 and any FOUR questions from the remaining.
2. Credit will be given for brief answers that are to the point.
3. Figures to the right indicate full marks.
4. Begin each answer on a fresh page. Neatness will be appreciated.
5. Mobile phones are not permitted in the examination hall.

Q1. (a) Match each word in column A with its meaning in column B:

(5 marks)

A	B
(i) <i>plying</i>	(a) non-observance (of rules, etc.)
(ii) <i>enforce</i>	(b) danger
(iii) <i>fatal</i>	(c) moving between places
(iv) <i>violation</i>	(d) a person who walks
(v) <i>pedestrian</i>	(e) severe
(vi) <i>stringent</i>	(f) abnormal accumulation of people, traffic, etc.
(vii) <i>regulations</i>	(g) resulting in death
(viii) <i>stray</i>	(h) make sure something is followed
(ix) <i>congestion</i>	(i) rules
(x) <i>hazard</i>	(j) wandering

(b) Use the words in column 'A' above to fill in the gaps in the paragraph below: (5 marks)

Vehicles _____ on the roads of India have been on the increase in recent years. They have contributed in great measure to the _____ of traffic on the roads, especially during the peak hours. The more disturbing aspect of the transport scene is the increasing number of accidents. _____ of traffic _____ by drivers results quite often in _____ mishaps. The drivers are often guilty of over speeding, rash and negligent driving and reckless overtaking on narrow stretches of roads. They are not afraid of _____ punishment since they believe the authorities will not _____ the laws strictly. Other factors that cause traffic _____ are _____ cattle on the road and the _____ who refuses to use the subway for crossing the road, but just darts across it.

Q2. What is meant by the term *Social Responsibility*? Why is it important for engineers? Distinguish between *Negative Social Responsibility* and *Positive Social Responsibility*. (10 marks)

Q3. What are the advantages and disadvantages of technology transfer? Is the import of high technology always beneficial to a developing country? Explain. (10 marks)

Q4. What do you mean by *appropriate technology*? How does this concept differ from the concept of *simple technology*? Explain clearly with suitable examples. (10 marks)

Q5. Do you agree with the statement: “Only well organized societies can build complex structures like pyramids or hydroelectric power stations”? Explain this statement to bring out the relationship between *technology* and *culture*. (10 marks)

Q6. “Corruption is a worldwide phenomenon. Anna Hazare’s recent movement alone cannot eradicate it unless supported by value based education at the grassroots level.” Suggest how you would inculcate ethical values in Indian youth if you were the minister for education. (10 marks)

Q7. Write short notes on any *TWO* of the following: (5 x 2 = 10 marks)

- (a) *Emerging, innovative, and established technologies*
- (b) *Simple technology and high technology*
- (c) *Intermediate technology and appropriate technology*
- (d) *Professional Ethics*

**Production Engineering Department
College of Engineering , Pune
End –Semester Examination (2010-11)**

**B. Tech (4th Semester/
Fluid Power (M.E. 210)**

Max Mark-60

Time -180 minutes

Solve any five Questions
Assume Suitable data whenever necessary

Que-1(a)	Explain the sources of contamination in hydraulic system	3
Que-1(b)	What is pressure compensated flow control valve	3
Que-1(c)	Explain the working of Jet Pump with its area of application and efficiency	4
Que-2(a)	Explain with neat sketch circuit of hydraulically operated grinding Machine	4
Que-2(b)	What is step less regulation .Explain torque converter with neat sketch	4
Que-2(c)	Illustrate the factors on which pressure drop in hose and pipe depends	2
Que-3(a)	Differentiate between positive displacement and non positive displacement pump on the basis of discharge, volumetric Efficiency, pressure, pressure relief valve, maintenance, primary purpose	3
Que-3(b)	A hydraulic motor has a displacement of 150cm^3 and operates with a pressure of 75 bars and speed of 1800 rpm. If the actual flow rate consumed by the motor is $0.005\text{ m}^3/\text{s}$ and the actual torque delivered by the motor is 165 N-m. Find mechanical, volumetric and overall efficiencies and actual kW delivered by motor	4
Que-3(c)	Draw the figures of nested cylinder, positioning cylinder and telescopic cylinder with its application	3
Que-4(a)	Explain the Burdon pressure gauge with neat sketch	4
Que-4(b)	Explain what are the factors are taken into consideration of design of hydraulic reservoir	3
Que-4(c)	Intensifier has a ram diameter of 150 mm and sliding cylinder diameter of 750mm. Calculate the pressure of water on the low pressure side of the intensifier if the pressure of water on high pressure side is 21000KN/m^2 . The loss due to friction at each of packing of the intensifier is 5% of the total force on each of the packings	3
Que-5(a)	Explain the various types of casing of centrifugal with suitable sketch	4

Que-5(b)	Explain the conditions which affects the selection of sealing device for a particular application	2
Que-5 (c)	An accumulator has a ram of 200mm diameter and lift of 6m. If the liquid is supplied at of 40 bars find (i) load on the ram(ii)capacity of accumulator	2
Que-5(d)	Explain the working principal of Hydraulic press with suitable mathematical logic	2
Que-6(a)	Explain with sketch direct operating sequence valve	4
Que-6(b)	Draw the symbol for unloading valve, gas charged accumulator, Pump and motor in same direction, filter with automatic drain, manual shut off valve, and lubricator	3
Que-6(c)	Differentiate between seat type and spool type direction control pneumatic valve	3

COLLEGE OF ENGINEERING, PUNE
(AN AUTONOMOUS INSTITUTE OF GOVT. OF MAHARASHTRA)
END SEMESTER EXAMINATION
(ME-211) DESIGN OF MACHINE ELEMENTS

Program: S.Y. Production

[Time: 3 Hours]

[Max.Mark:50]

Instructions to candidates: 1.Solve any one from Q.1, 2 and any two from Q.3, 4, 5.

2. Neat Diagrams must be drawn where ever necessary.

3. Assume suitable data if necessary.

4. Use of non programmable electronic calculators is allowed.

Q.1

- a) Explain step by step procedure in machine design with block diagram. (5)
- b) What is stress concentration? Explain causes and remedies. (4)
- c) Design turn-buckle to carry a load of 100 KN. The tie rod and nut are made of same material having permissible tensile stress as 75 N/mm² and Shear Stress as 30 N/mm². Draw the neat sketch of the joint. (4)

OR

Q.2

- a) Enlist general considerations in machine design. (4)
- b) Explain various theories of failure. (5)
- c) A right angle bell crank lever having one arm 500 mm and another arm 150 mm is used to lift a load of 5 KN. The permissible stresses for pin and lever are 80 MPa in tension and compression and 60 MPa in shear. The bearing pressure on pin is not to exceed 10 MPa. Determine the dimensions of rectangular cross-section of the lever and pin diameter. (4)

Q.3

- a) What is ASME code of shaft design? (5)
- b) A 400 mm diameter pulley 'A' mounted on a counter shaft midway between the bearing 1200 mm apart transmits 50 KW power to machine below it by a flat belt drive. The power is fed to the counter shaft by another pulley 'B' 300 mm in diameter and mounted at an overhung of 300 mm The electric motor vertically below pulley 'B' provides power to it. The belt tensions on both the pulleys are vertical and coefficient of friction between belt and pulley surface is 0.3. The counter shaft rotates at 560 r.p.m. Design the shaft taking permissible shear and normal stresses of 45N/mm² and 70 N/mm² respectively. (11)

Q.4

- a) Derive an expression for the torque required to raise the load by square thread and efficiency of square thread. When is the efficiency maximum? (8)
- b) A screw jack carries a load of 25KN. Design the screw and nut with the following data.
Coefficient of friction between screw and nut = 0.15.
Permissible compressive stress for screw = 42 N/mm²
Permissible shear stress for screw = 28 N/mm²

Permissible shear stress for nut = 21 N/mm^2

Permissible bearing pressure between nut and screw = 14 N/mm^2 .

Neglect collar friction and column action.

(8)

Q.5

a) Define following terms and state its significance in design of spring.

(4)

i) Spring index ii) Spring Stiffness.

b) List the materials used for spring wire.

(4)

c) Design closed coil helical spring for a service load ranging from 2207 N to 2698 N . The axial deflection of spring is 6 mm . Assuming spring index as 5 . The permissible shear stress is 420 N/mm^2 . Modulus of rigidity is 84000 N/mm^2 . Neglect the effect of stress concentration. Draw the dimensional Sketch.

(8)

All The Best

College of Engineering, Pune
ME 208: ENGINEERING THERMODYNAMICS AND HEAT TRANSFER
End Semester Examination: May 2011

S.Y. Production

Thursday, May 5, 2011

Time: 2.00 to 5.00 pm

Max. Marks: 50

Instructions:

- 1) Answer any **Five** questions.
- 2) Neat diagrams must be drawn **Wherever** necessary.
- 3) Figures at the **Right** indicate **Full** Marks.

- Q.1 a) How fuels are classified? Explain advantages and disadvantages of each type of fuel. [4]
- b) A gas has the following percentage of composition by volume; CO = 10%, H₂ = 48%, CH₄ = 28%, O₂ = 3%, CO₂ = 2%, N₂ = 9%. Estimate the minimum air required for complete combustion of 1m³ of fuel. If 50% excess air supplied find the composition of dry fuel gases on volume basis. [6]
- Q.2 a) A cold storage room has walls made of 220 mm of brick on the outside, 90 mm of plastic foam, and finally 16 mm of wood on the inside. The outside and inside air temperatures are 25°C and -3°C respectively. If the inside and outside heat transfer coefficients are respectively 30 and 11 W/m²°C, and the thermal conductivities of brick, foam and wood are 0.99, 0.022 and 0.17 W/m°C respectively, Determine: [5]
- (i) The rate of heat removal by refrigeration if the total wall area is 85m²;
 - (ii) The temperature of the inside surface of the brick
- b) What are Boundary Layer, Laminar flow and Turbulent flow? Draw the sketch of Hydrodynamic Boundary layer formed when fluid flows over a flat plate and explain the effect of laminar and turbulent flow over the boundary layer. [5]
- Q.3 a) An oil cooler for a lubrication system has to cool 1000 kg/h of oil (C_p = 2.09 kJ/kg°C) from 80°C to 40°C by using a cooling water flow of 1000 kg/h at 30°C. For a counter-flow heat exchanger, calculate the surface area of the heat exchanger, if the overall heat transfer coefficient is 24 W/m²°C. Take C_p of water = 4.18 kJ/kg°C. [5]
- b) What is the present status of conventional power in India? Why it is necessary to generate power from non-conventional energy sources? How energy can be generated from different types of NCES? [5]
- Q.4 a) What is high pressure boiler? What are the different types of high pressure boilers available? With the help of schematic diagram explain working of any one H.P. boiler. [5]
- b) A steam engine operates on ideal Carnot cycle using dry saturated steam at 17.5 bar. The exhaust takes place at 0.07 bar into a condenser. Assuming that the expansion and compression are isentropic and liquid enters the boiler as saturated liquid; find (a) the power developed by the engine if the steam consumption is 20 kg/min and (b) the efficiency of the operating cycle. [5]

- Q.5 a) A single cylinder 4-stroke cycle oil engine works on diesel cycle. The following readings were taken when the engine was running at full load: [6]
 Area of indicator = 3cm^2 , length of the diagram = 4cm , Spring constant = 10 bar/cm , speed of the engine = 400 r.p.m. , Load on the brake = 380 N , Spring reading = 50 N , Diameter of the brake drum = 120 cm , Fuel consumption = 2.8 kg/hr , Calorific value of fuel = 42000 kJ/kg , Diameter of the cylinder = 16 cm , Stroke of the piston = 20 cm .
 From the given data, find
 (a) F.P. of the engine
 (b) Mechanical Efficiency
 (c) Brake Thermal Efficiency, and
 (d) Brake Mean Effective Pressure.

- b) Why cooling system is necessary in I.C. Engines? How I.C. Engines are cooled? What are the advantages and disadvantages of each type of cooling system? [4]

- Q.6 a) One kg mole of N_2 is contained in a vessel of 2.5 m^3 volume at 100°C . Evaluate (a) the pressure and specific volume of gas (b) If the ratio of specific heat is 1.4 , find the values of C_p and C_v (c) If the gas is cooled to 30°C , find the final pressure of the gas (d) Also find the increase in specific internal energy, increase in specific enthalpy and increase in specific entropy. Also find the magnitude of heat transfer. [5]

- b) Steam at 10 bar and 0.9 dry initially occupies 0.35 m^3 . It is expanded according to the law $pV^{1.25} = C$ until the pressure falls to 2 bar . Determine (a) the mass of steam used in the process, (b) the work done, (c) the change in the internal energy and (d) the heat exchange between the steam and surroundings. [5]

- Q.7 Write short notes on any four of the following [10]
 (a) Reynold's No, Nusselt No, Prandtl No, and Grashoff No.
 (b) Emissive power, Emmissivity, Plank's law and Wien's displacement law.
 (c) Working of two stroke I.C.Engines,
 (d) Carnot cycle and Rankine cycle
 (e) Working of solar flat plate collector
 (f) Classification of steam turbines.

P (bar)	T_s	v_g	Enthalpy			Internal Energy			Sp. Entropy		
			h_f	h_{fg}	h_g	U_f	u_{fg}	u_g	s_f	s_{fg}	s_g
0.07	39.03	20.53	163.4	2409.2	2572.6	162.6	2265.9	2428.5	0.559	7.718	8.277
2.00	120.2	0.885	504.7	2201.6	2706.3	504.5	2025.0	2529.5	1.530	5.597	7.127
10.00	179.9	0.194	762.6	2013.6	2776.2	761.7	1822.0	2583.7	2.138	4.445	6.583
17.50	205.7	0.113	878.2	1915.9	2794.1	876.5	1721.4	2597.8	2.384	4.001	6.385

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[Time: 3 Hours]

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All The Best

College of Engineering, Pune – 5.
(An Autonomous Institute of Government of Maharashtra)

END-SEMESTER EXAM
Machining Science and Technology (PE 204)

Programme: S.Y.B. Tech. (Production)
Year: 2010 –11; Semester: II
Duration: 3 Hrs.

Date: 26-4-11
Max. Marks: 50

Instructions:

1. Figures to the right indicate full marks.
2. Draw neat sketches wherever required.
3. Use of pocket calculators is allowed.

Q.1	a.	Describe the procedure of examination of Plane surfaces using Spirit level and Autocollimator.	5
	b.	What are the different types of tool wear? Explain with suitable sketch.	5
	OR		
	c.	What is Case hardening and what are the different types of case hardening?	5
Q.2	a.	A key way is to be broached in the bore of a low alloy steel gear. Design a broach with the following data: i. Bore diameter: 36 mm ii. Bore length: 40 mm iii. Width of key way: 5 mm iv. Depth of key way: 3.2 mm v. Specific cutting force C: 45 N/mm ²	5
	b.	Discuss the design features of a milling cutter with suitable sketch.	5
	OR		
	c.	Explain the various types of reamers along with their specific use.	5
Q.3	a.	Illustrate the working principle of Plasma Arc Machining with suitable sketch.	5
	b.	Explain the process of Electrical Discharge Machining, its process parameters and applications.	5
	OR		
	c.	What is EBM? Sketch its set up and indicate its main parts and explain the principle of operation.	5
Q.4	a.	With the aid of sketch explain the working principle of gear hobbing.	5
	b.	How gear is manufactured using Sunderland method?	5
	OR		
	c.	Explain extruding and cold drawing process used for gear manufacturing.	5
Q.5	a.	Enumerate thread chasing operation with suitable sketch.	5
	b.	What is die threading operation and what are the different dies used to manufacture external threads.	5
OR			
		Explain the working principle of Electrochemical machining. Give some practical applications of electro chemical machining process	5

College of Engineering, Pune

End Semester Exam – May 2011

S.Y. Production

(EE217)- (Industrial Electronics and Electrical Drive Systems)

Day & Date- 3rd May 2011
Maximum Marks: 50

Time: - 2 pm to 5 pm
Duration – 3 hrs.

Instructions:

1. Answer any 5 questions.
2. Assume suitable data, if necessary and state the same.
3. Figures to the right indicate full marks.

			Marks
Q. 1	a	For a dc motor, derive the equations for back emf(E) and torque developed(T) from the fundamental principles in terms of flux/pole(Φ), number of armature conductors (Z), speed of motor(N) and number of parallel paths(A) in armature.	5
	b	A 4 pole, 500V, d.c shunt motor has 720 wave-connected conductors on its armature. The full load armature current is 60A and flux/pole is 30mWb. Armature resistance is 0.2 ohm. The field winding has a resistance of 250 ohm and contact drop per brush is 1V. Calculate full load speed of the motor and input.	5
Q. 2	a	Describe any three methods of speed control of 3-phase induction motors. Draw neat diagrams.	5
	b	A 440V, 50Hz, 6-pole, Y connected 3-phase induction motor runs at 975 rpm when the input is 40kW. The stator losses are 1kW and friction and windage losses total 2kW. Calculate the slip, rotor copper loss, rotor input, mechanical output and efficiency of the motor.	5
Q3	a	Discuss the effects of variation of load and excitation on a 3-phase cylindrical rotor synchronous motor.	5
	b	A 2000V, 3phase, star connected synchronous motor has $r_a = 0.2$ ohm and $x_s = 2.2$ ohm per phase. The input is 800kW at normal voltage and induced emf/phase = 2500V. Calculate line current and p.f.	5
Q4	a	Discuss the different factors to be considered in the selection of electric drive.	5
	b	Explain the principle of working and constructional features of a single phase shaded pole motor. Give two applications of this motor.	5
Q5	a	Draw the circuit symbol, static V-I characteristics and give two applications of the following semi-conductor devices:- (i) SCR; (ii) triac ; (iii) IGBT.	5
	b	With a neat circuit diagram, explain the over-voltage protection using SCRs for a load fed from 1-phase ac mains.	5

Q6	a	Draw the pin-diagram of the op-amp 741C and state the characteristics of an ideal op-amp.	3
	b	Draw the circuit diagram of a Schmitt trigger and explain its working.	4
	c	Explain the working of a IC555 when connected for monostable multivibrator operation. Draw the circuit diagram.	3
Q7		Write short notes on the following:- (a) Resistance welding; (b) opamp as waveform generator; (c) Light dimmer using triac.	3+3+4
