



جمهورية العراق  
وزارة التعليم العالي و البحث العلمي  
جامعة الفرات الأوسط التقنية  
الكلية التقنية الهندسية / النجف



قسم هندسة تقنيات السيارات

المرحلة الأولى

أسئلة الفصل الثاني للعام الدراسي

٢٠١٥-٢٠١٦

شعبة ضمان الجودة و الأمان الجامعي

قسم السيارات  
1/1



Ministry of Higher Education and Scientific Research  
Al-Furat Al-Awsat Technical University  
Tech. Eng. College – Najaf/Auto. Tech Eng.Dept/



Subject: Thermodynamic  
Time: 2 hr

Class: 1st level  
Date: 24\4\2016

**Notes// 1. Please read carefully, 2. Answer all questions**

**Q1.** A two kilograms of air undergoes a three-process cycle : (1 → 2): constant-pressure compression, (2 → 3): constant volume, (3 → 1): constant-temperature expansion .The necessary information is  $T_1 = 100^\circ\text{C}$ ,  $T_2 = 600^\circ\text{C}$ , and  $P_1 = 200 \text{ kPa}$ , (Take for air :  $R = 0.287 \text{ kJ/kg.K}$ ). Find : (a) The work done , (b) sketch (p-v) diagram of these processes. (25%)

**Q2.** Show that (Answer only two branches): (20%)

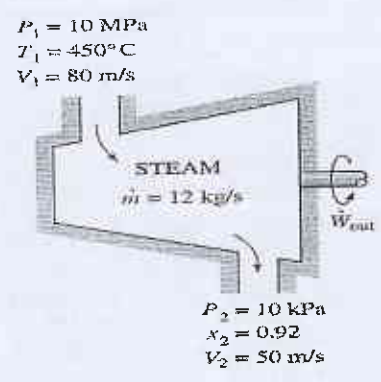
**A)**  $\vec{V}_e = \sqrt{2(h_i - h_e) + \vec{V}_i^2}$  ..... [For adiabatic nozzle, no work, change in potential energy is neglected]

**B)**  $W = \frac{mR(T_2 - T_1)}{1 - n}$  ..... [Polytropic process work for an ideal gas]

**C)**  $C_p - C_v = R$

**Q3.** Water is in a rigid tank of volume  $1 \text{ m}^3$  at initial pressure of  $1200 \text{ kPa}$  and temperature of  $450^\circ\text{C}$ . It is cooled to a final temperature of  $155^\circ\text{C}$ . (a) find the final pressure in the tank in [kPa], (b) the change in internal energy and enthalpy in [kJ] , (c) heat transfer from the system in [kJ]. (25%)

**Q4.** Steam flows steadily through an adiabatic turbine. The inlet conditions of the superheated steam are  $10 \text{ MPa}$ ,  $450^\circ\text{C}$ , and  $80 \text{ m/s}$ , and the exit conditions are  $10 \text{ kPa}$ ,  $92 \%$  quality, and  $50 \text{ m/s}$ . The mass flow rate of the steam is  $12 \text{ kg/s}$ . Determine (a) the change in kinetic energy, (b) the power output, and (c) the turbine inlet area. (30%)



Lec. Salah M.S.

With Best Wishes

Head of Dept





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Subject: Thermodynamic

Time: 2 hr

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TABLE A-4

Saturated water—Temperature table

Temp., $T$ , °C	Sat. press., $P_{sat}$ , kPa	Specific volume, $m^3/kg$		Internal energy, kJ/kg			Enthalpy, kJ/kg			Entropy, kJ/kg·K		
		Sat. liquid, $v_f$	Sat. vapor, $v_g$	Sat. liquid, $u_f$	Evap., $u_{fg}$	Sat. vapor, $u_g$	Sat. liquid, $h_f$	Evap., $h_{fg}$	Sat. vapor, $h_g$	Sat. liquid, $s_f$	Evap., $s_{fg}$	Sat. vapor, $s_g$
0.01	0.6117	0.001000	206.00	0.000	2374.9	2374.9	0.001	2500.9	2500.9	0.0000	9.1556	9.1556
5	0.8725	0.001000	147.03	21.019	2360.8	2381.8	21.020	2489.1	2510.1	0.0763	8.9487	9.0249
10	1.2281	0.001000	106.32	42.020	2346.6	2388.7	42.022	2477.2	2519.2	0.1511	8.7488	8.8999
15	1.7057	0.001001	77.885	62.980	2332.5	2395.5	62.982	2465.4	2528.3	0.2245	8.5559	8.7803
20	2.3392	0.001002	57.762	83.913	2318.4	2402.3	83.915	2453.5	2537.4	0.2965	8.3696	8.6661
25	3.1698	0.001003	43.340	104.83	2304.3	2409.1	104.83	2441.7	2546.5	0.3672	8.1895	8.5567
30	4.2469	0.001004	32.879	125.73	2290.2	2415.9	125.74	2429.8	2555.6	0.4368	8.0152	8.4520
35	5.6291	0.001006	25.205	146.63	2276.0	2422.7	146.64	2417.9	2564.6	0.5051	7.8466	8.3517
40	7.3851	0.001008	19.515	167.53	2261.9	2429.4	167.53	2406.0	2573.5	0.5724	7.6832	8.2556
45	9.5953	0.001010	15.251	188.43	2247.7	2436.1	188.44	2394.0	2582.4	0.6385	7.5247	8.1533
50	12.352	0.001012	12.026	209.33	2233.4	2442.7	209.34	2382.0	2591.3	0.7038	7.3710	8.0748
55	15.763	0.001015	9.5639	230.24	2219.1	2449.3	230.26	2369.8	2600.1	0.7680	7.2218	7.9898
60	19.947	0.001017	7.6670	251.16	2204.7	2455.9	251.18	2357.7	2608.8	0.8313	7.0769	7.9082
65	25.043	0.001020	6.1935	272.09	2190.3	2462.4	272.12	2345.4	2617.5	0.8937	6.9360	7.8296
70	31.202	0.001023	5.0396	293.04	2175.8	2468.9	293.07	2333.0	2626.1	0.9551	6.7989	7.7540
75	38.597	0.001026	4.1291	313.99	2161.3	2475.3	314.03	2320.5	2634.6	1.0158	6.6655	7.6812
80	47.416	0.001029	3.4053	334.97	2146.6	2481.6	335.02	2308.0	2643.0	1.0756	6.5355	7.6111
85	57.868	0.001032	2.8261	355.96	2131.9	2487.8	356.02	2295.3	2651.4	1.1346	6.4089	7.5435
90	70.183	0.001036	2.3593	376.97	2117.0	2494.0	377.04	2282.5	2659.6	1.1929	6.2853	7.4782
95	84.609	0.001040	1.9808	398.00	2102.0	2500.1	398.09	2269.6	2667.8	1.2504	6.1647	7.4151
100	101.42	0.001043	1.6720	419.06	2087.0	2506.0	419.17	2256.4	2675.6	1.3072	6.0470	7.3542
105	120.90	0.001047	1.4186	440.15	2071.8	2511.9	440.28	2243.1	2683.4	1.3634	5.9319	7.2952
110	143.38	0.001052	1.2094	461.27	2056.4	2517.7	461.42	2229.7	2691.1	1.4188	5.8193	7.2382
115	169.18	0.001056	1.0360	482.42	2040.9	2523.3	482.59	2216.0	2698.6	1.4737	5.7092	7.1829
120	198.67	0.001060	0.89133	503.60	2025.3	2528.9	503.81	2202.1	2706.0	1.5279	5.6013	7.1292
125	232.23	0.001065	0.77012	524.83	2009.5	2534.3	525.07	2188.1	2713.1	1.5816	5.4956	7.0771
130	270.28	0.001070	0.66808	546.10	1993.4	2539.5	546.38	2173.7	2720.1	1.6348	5.3919	7.0265
135	313.22	0.001075	0.58179	567.41	1977.3	2544.7	567.75	2159.1	2726.9	1.6872	5.2901	6.9773
140	361.53	0.001080	0.50860	588.77	1960.9	2549.6	589.16	2144.3	2733.5	1.7392	5.1901	6.9294
145	415.68	0.001085	0.44600	610.19	1944.2	2554.4	610.64	2129.2	2739.8	1.7908	5.0919	6.8827
150	476.16	0.001091	0.39248	631.66	1927.4	2559.1	632.18	2113.8	2745.9	1.8418	4.9953	6.8371
155	543.49	0.001096	0.34648	653.19	1910.3	2563.5	653.79	2098.0	2751.8	1.8924	4.9002	6.7927
160	618.23	0.001102	0.30680	674.79	1893.0	2567.8	675.47	2082.0	2757.5	1.9426	4.8066	6.7492
165	700.93	0.001108	0.27244	696.46	1875.4	2571.9	697.24	2065.6	2762.8	1.9923	4.7143	6.7067

TABLE A-5

Saturated water—Pressure table

Press., $P$ , kPa	Sat. temp., $T_{sat}$ , °C	Specific volume, $m^3/kg$		Internal energy, kJ/kg			Enthalpy, kJ/kg			Entropy, kJ/kg·K		
		Sat. liquid, $v_f$	Sat. vapor, $v_g$	Sat. liquid, $u_f$	Evap., $u_{fg}$	Sat. vapor, $u_g$	Sat. liquid, $h_f$	Evap., $h_{fg}$	Sat. vapor, $h_g$	Sat. liquid, $s_f$	Evap., $s_{fg}$	Sat. vapor, $s_g$
1.0	6.97	0.001000	129.19	29.302	2355.2	2384.5	29.303	2484.4	2513.7	0.1059	8.8690	8.9749
1.5	13.02	0.001001	87.964	54.686	2338.1	2392.8	54.688	2470.1	2524.7	0.1956	8.6314	8.8270
2.0	17.50	0.001001	66.990	73.431	2325.5	2398.9	73.433	2459.5	2532.9	0.2606	8.4621	8.7227
2.5	21.08	0.001002	54.242	88.422	2315.4	2403.8	88.424	2451.0	2539.4	0.3118	8.3302	8.6421
3.0	24.08	0.001003	45.654	100.98	2306.9	2407.9	100.98	2443.9	2544.8	0.3543	8.2222	8.5765
4.0	28.96	0.001004	34.791	121.39	2293.1	2414.5	121.39	2432.3	2553.7	0.4224	8.0510	8.4734
5.0	32.87	0.001005	28.185	137.75	2282.1	2419.8	137.75	2423.0	2560.7	0.4762	7.9176	8.3938
7.5	40.29	0.001008	19.233	168.74	2261.1	2429.8	168.75	2405.3	2574.0	0.5763	7.6738	8.2501
10	45.81	0.001010	14.670	191.79	2245.4	2437.2	191.81	2392.1	2583.9	0.6492	7.4996	8.1488
15	53.97	0.001014	10.020	225.93	2222.1	2448.0	225.94	2372.3	2598.3	0.7549	7.2522	8.0071
1000	179.88	0.001127	0.19436	761.39	1821.4	2582.8	762.51	2014.6	2777.1	2.1381	4.4470	6.5850
1100	184.06	0.001133	0.17745	779.78	1805.7	2585.5	781.03	1999.6	2780.7	2.1785	4.3735	6.5520
1200	187.96	0.001138	0.16326	796.96	1790.9	2587.8	798.33	1985.4	2783.8	2.2159	4.3058	6.5217
1300	191.60	0.001144	0.15119	813.10	1776.8	2589.9	814.59	1971.9	2786.5	2.2508	4.2428	6.4936
1400	195.04	0.001149	0.14078	828.35	1763.4	2591.8	829.96	1958.9	2788.9	2.2835	4.1840	6.4675
1500	198.29	0.001154	0.13171	842.82	1750.6	2593.4	844.55	1946.4	2791.0	2.3143	4.1287	6.4430





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**Notes// 1. Please read carefully, 2. Answer all questions**

**TABLE A-6**

Superheated water (Concluded)

T °C	v m <sup>3</sup> /kg	u kJ/kg	h kJ/kg	s kJ/kg·K	v m <sup>3</sup> /kg	u kJ/kg	h kJ/kg	s kJ/kg·K	v m <sup>3</sup> /kg	u kJ/kg	h kJ/kg	s kJ/kg·K
P = 1.00 MPa (179.88°C)				P = 1.20 MPa (187.96°C)				P = 1.40 MPa (195.04°C)				
Sat.	0.19437	2582.8	2777.1	6.5850	0.16326	2587.8	2783.8	6.5217	0.14078	2591.8	2788.9	6.4675
200	0.20602	2622.3	2828.3	6.6956	0.16934	2612.9	2816.1	6.5909	0.14303	2602.7	2803.0	6.4975
250	0.23275	2710.4	2943.1	6.9265	0.19241	2704.7	2935.6	6.8313	0.16356	2698.9	2927.9	6.7488
300	0.25799	2793.7	3051.6	7.1246	0.21386	2789.7	3046.3	7.0335	0.18233	2785.7	3040.9	6.9553
350	0.28250	2875.7	3158.2	7.3029	0.23455	2872.7	3154.2	7.2139	0.20029	2869.7	3150.1	7.1379
400	0.30661	2957.9	3264.5	7.4670	0.25482	2955.5	3261.3	7.3793	0.21782	2953.1	3258.1	7.3046
500	0.35411	3125.0	3479.1	7.7642	0.29464	3123.4	3477.0	7.6779	0.25216	3121.8	3474.8	7.6047
600	0.40111	3297.5	3698.6	8.0311	0.33395	3296.3	3697.0	7.9456	0.28597	3295.1	3695.5	7.8730
700	0.44783	3476.3	3924.1	8.2755	0.37297	3475.3	3922.9	8.1904	0.31951	3474.4	3921.7	8.1183
800	0.49438	3661.7	4156.1	8.5024	0.41184	3661.0	4155.2	8.4176	0.35288	3660.3	4154.3	8.3458
900	0.54083	3853.9	4394.8	8.7150	0.45059	3853.3	4394.0	8.6303	0.38614	3852.7	4393.3	8.5587
1000	0.58721	4052.7	4640.0	8.9155	0.48928	4052.2	4639.4	8.8310	0.41933	4051.7	4638.8	8.7595
1100	0.63354	4257.9	4891.4	9.1057	0.52792	4257.5	4891.0	9.0212	0.45247	4257.0	4890.5	8.9497
1200	0.67983	4469.0	5148.9	9.2866	0.56652	4468.7	5148.5	9.2022	0.48558	4468.3	5148.1	9.1308
1300	0.72610	4685.8	5411.9	9.4593	0.60509	4685.5	5411.6	9.3750	0.51866	4685.1	5411.3	9.3036
P = 1.60 MPa (201.37°C)				P = 1.80 MPa (207.11°C)				P = 2.00 MPa (212.38°C)				
Sat.	0.12374	2594.8	2792.8	6.4200	0.11037	2597.3	2795.9	6.3775	0.09959	2599.1	2798.3	6.3390
225	0.13293	2645.1	2857.8	6.5537	0.11678	2637.0	2847.2	6.4825	0.10381	2628.5	2836.1	6.4160
250	0.14190	2692.9	2919.9	6.6753	0.12502	2686.7	2911.7	6.6088	0.11150	2680.3	2903.3	6.5475
300	0.15866	2781.6	3035.4	6.8864	0.14025	2777.4	3029.9	6.8246	0.12551	2773.2	3024.2	6.7684
350	0.17459	2866.6	3146.0	7.0713	0.15450	2863.6	3141.9	7.0120	0.13860	2860.5	3137.7	6.9583
400	0.19007	2950.8	3254.9	7.2394	0.16849	2948.3	3251.6	7.1814	0.15122	2945.9	3248.4	7.1292
500	0.22029	3120.1	3472.6	7.5410	0.19551	3118.5	3470.4	7.4845	0.17568	3116.9	3468.3	7.4337
600	0.24999	3293.9	3693.9	7.8101	0.22200	3292.7	3692.3	7.7543	0.19962	3291.5	3690.7	7.7043
700	0.27941	3473.5	3920.5	8.0558	0.24822	3472.6	3919.4	8.0005	0.22326	3471.7	3918.2	7.9509
800	0.30865	3659.5	4153.4	8.2834	0.27426	3658.8	4152.4	8.2284	0.24674	3658.0	4151.5	8.1791
900	0.33780	3852.1	4392.6	8.4965	0.30020	3851.5	4391.9	8.4417	0.27012	3850.9	4391.1	8.3925
1000	0.36687	4051.2	4638.2	8.6974	0.32606	4050.7	4637.6	8.6427	0.29342	4050.2	4637.1	8.5936
1100	0.39589	4256.6	4890.0	8.8878	0.35188	4256.2	4889.6	8.8331	0.31667	4255.7	4889.1	8.7842
1200	0.42488	4467.9	5147.7	9.0689	0.37766	4467.6	5147.3	9.0143	0.33989	4467.2	5147.0	8.9654
1300	0.45383	4684.8	5410.9	9.2418	0.40341	4684.5	5410.6	9.1872	0.36308	4684.2	5410.3	9.1384
P = 9.0 MPa (303.35°C)				P = 10.0 MPa (311.00°C)				P = 12.5 MPa (327.81°C)				
Sat.	0.020489	2558.5	2742.9	5.6791	0.018028	2545.2	2725.5	5.6159	0.013496	2505.6	2674.3	5.4638
325	0.023284	2647.6	2857.1	5.8738	0.019877	2611.6	2810.3	5.7596				
350	0.025816	2725.0	2957.3	6.0380	0.022440	2699.6	2924.0	5.9460	0.016138	2624.9	2826.6	5.7130
400	0.029960	2849.2	3118.8	6.2876	0.026436	2833.1	3097.5	6.2141	0.020030	2789.6	3040.0	6.0433
450	0.033524	2956.3	3258.0	6.4872	0.029782	2944.5	3242.4	6.4219	0.023019	2913.7	3201.5	6.2749
500	0.036793	3056.3	3387.4	6.6603	0.032811	3047.0	3375.1	6.5995	0.025630	3023.2	3343.6	6.4651
550	0.039885	3153.0	3512.0	6.8164	0.035655	3145.4	3502.0	6.7585	0.028033	3126.1	3476.5	6.6317
600	0.042861	3248.4	3634.1	6.9606	0.038378	3242.0	3625.8	6.9045	0.030306	3225.8	3604.6	6.7828
650	0.045755	3343.4	3755.2	7.0954	0.041018	3338.0	3748.1	7.0408	0.032491	3324.1	3730.2	6.9227
700	0.048589	3438.8	3876.1	7.2229	0.043597	3434.0	3870.0	7.1693	0.034612	3422.0	3854.6	7.0540
800	0.054132	3632.0	4119.2	7.4606	0.048629	3628.2	4114.5	7.4085	0.038724	3618.8	4102.8	7.2967
900	0.059562	3829.6	4365.7	7.6802	0.053547	3826.5	4362.0	7.6290	0.042720	3818.9	4352.9	7.5195
1000	0.064919	4032.4	4616.7	7.8855	0.058391	4029.9	4613.8	7.8349	0.046641	4023.5	4605.5	7.7269
1100	0.070224	4240.7	4872.7	8.0791	0.063183	4238.5	4870.3	8.0289	0.050510	4233.1	4864.5	7.9220
1200	0.075492	4454.2	5133.6	8.2625	0.067938	4452.4	5131.7	8.2126	0.054342	4447.7	5127.0	8.1065
1300	0.080733	4672.9	5399.5	8.4371	0.072667	4671.3	5398.0	8.3874	0.058147	4667.3	5394.1	8.2819



قسم الميكانيكا  
١٢٥



Ministry of Higher Education and Scientific Research  
Al-Furat Al-Awsat Technical University  
Tech. Eng. College – Najaf/Auto. Tech Eng.Dept/



Subject: Thermodynamic  
Time: 2 hr

Class: 1st level  
Date: 24/4/2016

**Notes// 1. Please read carefully, 2. Answer all questions**

**Q1. \\** A two kilograms of air undergoes a three-process cycle :(1 →2): constant-pressure compression, (2→3): constant volume, (3 →1): constant-temperature expansion .The necessary information is T1= 100°C, T2= 600°C, and P1= 200 kPa,(Take for air :R=0.287 kJ/kg.K). Find : (a) The work done ,(b) sketch (p-v) diagram of these processes. **(25%)**

**Q2. \\ Show that (Answer only two branches): **(20%)****

**A)  $\vec{V}_e = \sqrt{2(h_i - h_e) + \vec{V}_i^2}$  ..... [For adiabatic nozzle, no work, change in potential energy is neglected]**

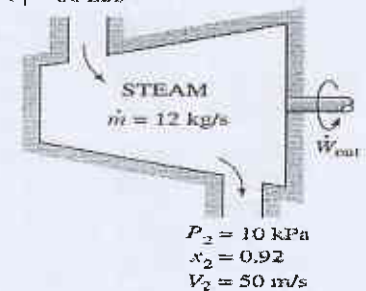
**B)  $W = \frac{mR(T_2 - T_1)}{1 - n}$  ..... [Polytropic process work for an ideal gas]**

**C)  $C_p - C_v = R$**

**Q3. \\** Water is in a rigid tank of volume 1m<sup>3</sup> at initial pressure of 1200 kPa and temperature of 450°C. It is cooled to a final temperature of 155°C.(a) find the final pressure in the tank in [kPa], (b) the change in internal energy and enthalpy in [kJ] , (c) heat transfer from the system in [kJ]. **(25%)**

**Q4. \\** Steam flows steadily through an adiabatic turbine. The inlet conditions of the superheated steam are 10 MPa, 450°C, and 80 m/s, and the exit conditions are 10 kPa, 92 % quality, and 50 m/s. The mass flow rate of the steam is 12 kg/s. Determine (a) the change in kinetic energy, (b) the power output, and (c) the turbine inlet area. **(30%)**

P<sub>1</sub> = 10 MPa  
T<sub>1</sub> = 450°C  
V<sub>1</sub> = 80 m/s



Lec. Salah M.S.

With Best Wishes

Head of Dept  
i.p.p.o



Ministry of Higher Education and Scientific Research  
Al-Furat Al-Awsat Technical University  
Tech. Eng. College – Najaf/Automobile Tech. Eng. Dept.  
2<sup>nd</sup> Semester Examination 2016



Subject: Mathematics

Time: 2 hours

Class: 1<sup>st</sup> year.

Date: 26 /4 /2016.

Notes// 1. Please read the questions carefully, 2. Answer all question.

Q1) Evaluate the following integrals:

(25 Marks)

1-  $\int \frac{\cot(\ln x)}{x} dx$

2-  $\int x (a + b\sqrt{3x}) dx$

Where  $a$  and  $b$  constants.

3-  $\int \frac{1}{\sqrt{2-x^2}} dx$

4-  $\int \frac{e^{\sqrt{x}} - 1}{\sqrt{x}} dx$

5-  $\int \sqrt{x^2 - x^4} dx$

Q2)

A: Find the derivatives of the following function.

(20 Marks)

1-  $y = x \sinh 2x - \frac{1}{2} \cosh 2x$

2-  $y = \operatorname{sech}^3 x$

B: Prof that:

(30 Marks)

1-  $\int \cos^2 \theta d\theta = \frac{1}{2} \left[ \theta + \frac{1}{2} \sin 2\theta \right] + c$

2-  $\int \sin^3 x dx = -\cos x + \frac{1}{3} \cos^3 x + c$

3-  $\int \sin^{-1} ax dx = x \cdot \sin^{-1} ax + \frac{\sqrt{1-ax^2}}{a} + c$

Q3)

A: Find the area bounded the curve  $y = x^2$  and the line  $y = x$ .

(15 Marks)

B: Find the values of  $x$  and  $y$  for the following matrix equation:

(10 Marks)

$$\begin{bmatrix} y - 2x & 0 \\ -2 & 6 \end{bmatrix} = \begin{bmatrix} 3 & 0 \\ -2 & x + y \end{bmatrix}$$

Examiner

Dr. Qahtan A. Abed



Head of Dept.  
Dr. Haider Hassan


Subject: Windows  
Time: 2 hours

Class: 1<sup>st</sup> year  
Date: 27 / 4 / 2016

*Notes// 1. Please read the questions carefully, 2. Answer all question*

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- Q1: How can you change the background of the desktop ? (10 degree)
- Q2: How can you remove program from the windows system? (15 degree)
- Q3: How can you add printer to your computer ? (10 degree)
- Q4: How can you change the margins of the page (1cm from all sides)?  
(15 degree)
- Q5: How can you search file in your computer ? (10 degree)
- Q6: How can you take picture to the screen of the windows? (15 degree)
- Q7: Write the stages of the format and installing the windows on the computer ?  
(25 degree)



Dr. Eng. Mahdi Hatf Kadhum  
The Teacher





الاجابة على اربعة اسئلة فقط

- س١ عرف الديمقراطية تعريفاً شاملاً ثم بين اهم العناصر الاساسية للديمقراطية
- س٢ الاجابة عن احد الفرضين:  
١- عرف مفهوم حقوق الانسان وماهي اهم الخصائص والاجيال لتلك الحقوق .  
ب- للديمقراطية انواع عددها واشرح واحد منها  
س٣ يقوم الدستور الديمقراطي على خمس مبادئ عددها واشرح واحد منها  
س٤ الاجابة على احد الفرضين :  
١- لمناظرات حقوق الانسان اهمية خاصة في فهم فكرة ومفهوم حق الانسان وشرح واحد منها وبأسهاب  
ب اشرح الاديان الخاصة بالاعلان العالمي لحقوق الانسان ثم اذكر ثلاثة من اهم مواد الاعلان العالمي لحقوق الانسان .  
س٥ لم يتخذ توسع الديمقراطية في القرن العشرين شكلا الانتقال الطبيعي في كل بلد على حده بل يشكل ((موجات ديمقراطية)) ناقش ذلك

مدرس المادة  
الدكتور موكب الاعرجي

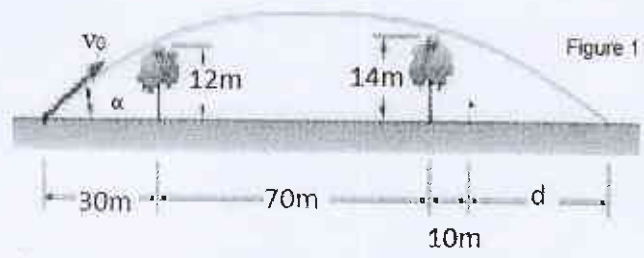
رئيس القسم

قسم السيارات  
١٢٤٣

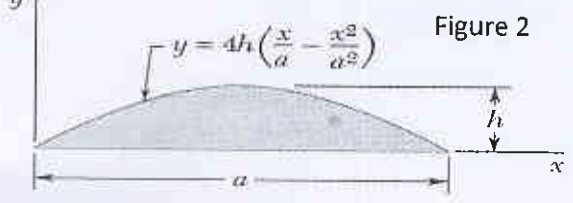


Attempt all questions

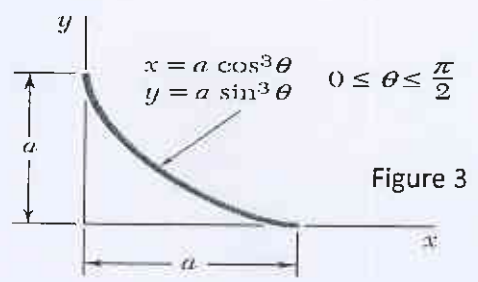
- Q1) The motion of a particle is defined by the relation  $x = 2t^3 - 15t^2 + 24t + 4$ , where  $x$  and  $t$  are expressed in meters and seconds, respectively. Determine (a) when the velocity is zero, (b) the position and the total distance traveled when the acceleration is zero. (20 degree)
- Q2) A golfer hits a ball as shown in Figure 1, with an initial velocity of magnitude  $v_0$  at an angle  $\alpha$  with the horizontal. Knowing that the ball must clear the tops of two trees and land as close as possible to the flag, determine  $v_0$  and the distance  $d$  when the golfer uses (a) a six-iron with  $\alpha = 31^\circ$ , (b) a five-iron with  $\alpha = 27^\circ$ . (20 degree)



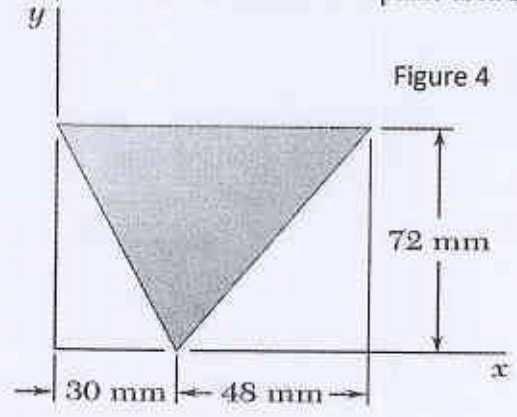
- Q3) Determine by direct integration the moment of inertia of the shaded area with respect to the  $y$  and  $x$  axis as shown in Figure 2. (20 degree)



- Q4) A homogeneous wire is bent into the shape shown in Figure 3. Determine by direct integration the  $x$  and  $y$  coordinate of its centroid. (20 degree)



- Q5) Locate the centroid of the plane area shown in Figure 4. (20 degree)



*[Signature]*  
رئيس القسم

د. حيدر العبدلي

*[Signature]*  
مدرس المادة

د. حيدر العبدلي

*Technical College of Najaf*

*Subject: Automotive Materials*

*Automotive Department*

*Class: 1<sup>st</sup> Stage*

*Examiner: Oras khudayer      Second Attempt (2015-2016)      Time : hrs*

.....  
**Q1/(A)** Write an essay on " The Joining of Metals" indicating clearly the essential differences between soldered , brazed and welded joints?( 20 D)  
**(B)** Define the Thermit welding ? (10 D)

.....  
**Q2/** What are the important physical properties of metals and alloys?(30D)

.....  
**Q3/(A)** Define the Impact tests? ( 20 D)  
**(B)** Show the force- extension diagram of a carbon steel ? ( 20 D)  
.....



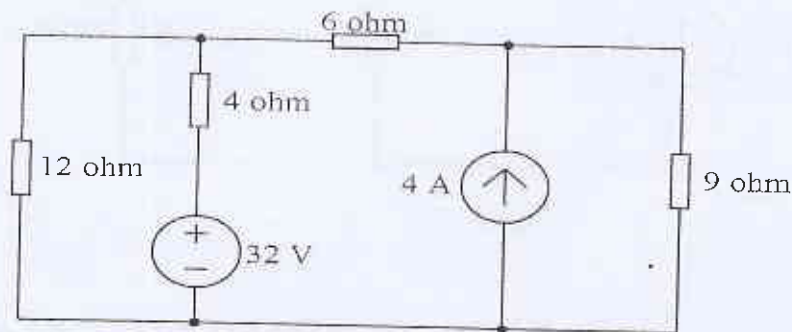


Note: Answer all questions

Q1/For the circuit shown in fig(1), calculate the current through the 9 ohm resistor using the superposition theorem.

(25 marks)

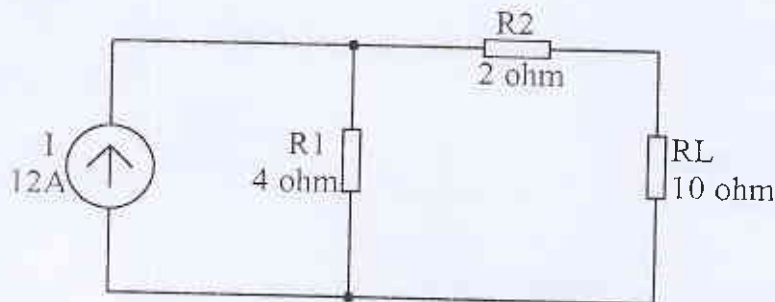
Fig.1



Q2/Using Thevenin's theorem, find the current in the  $R_L=10$  ohm of the network shown in fig(2).

(25 marks)

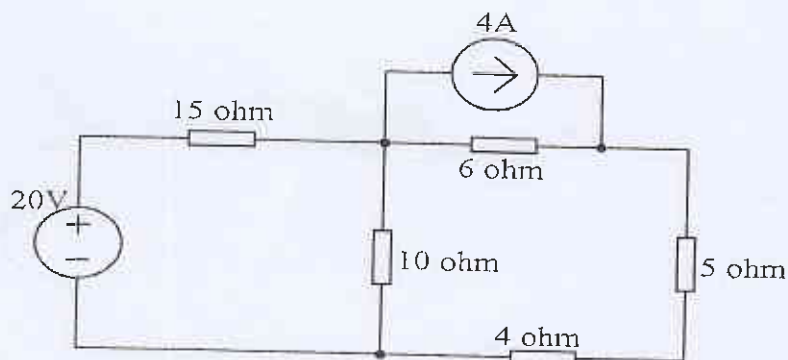
Fig.2



Q3/ For the circuit shown in fig(3), find the value of the current passing through the 5 ohm resistor using Norton's theorem. Calculate the power absorbed by this resistor.

(25 marks)

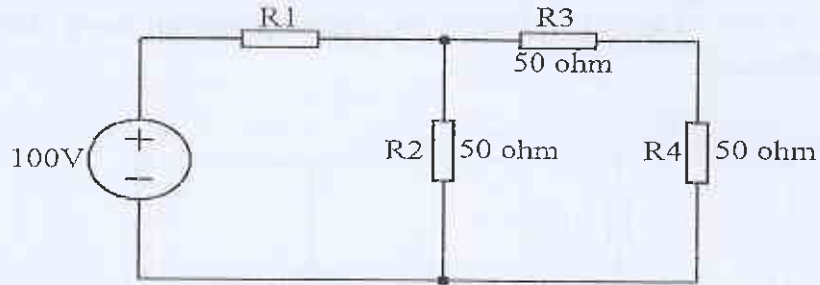
Fig.3






Q4/ For the circuit shown in fig(4), find the value of the resistor R1 such that the resistor R4 will receive maximum power. (25 marks)

Fig.4



*GOOD LUCK*

Head of department  
H. ALABDILI

  
Examiner  
I. ALSHIMAYSAWE