COLLEGE OF ENGINEERING PUNE-5.

(Formerly Government College of Engineering, Pune-411005).

End Semester Examination

EE:207- ELECTRICAL MACHINES-I

Programme: S.Y.B.Tech. Electrical Engg. Date:26/04/2011

Year: 2010-11 (Sem-II) Max. Marks: 50

Duration: 3 Hours.

Instructions: 1) Solve **ALL questions.**

2) A figure to the right bracket indicates full marks.

3) Use of electronic calculator is allowed.

4) **Draw neat figures** and assume necessary data wherever required.

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Q.1.

(a) A 6 kVA, 500/250 V, 50 Hz, single phase transformer has the following test results:
OC test (lv side): 250 V, 1.5 A, 80 W
SC test (hv side): 22 V, 10 A, 90 W
Determine; (i) the approximate equivalent circuit referred to h.v. side, (ii) voltage regulation and efficiency at full load and 0.8 pf lagging load, (iii) the efficiency of the transformer at half of full load and 0.8 pf lagging load, (iv) load kVA at which maximum efficiency occurs and also the maximum efficiency at 0.8 pf lagging. **(7)**

(b) Two transformers A and B are connected in parallel and supply 800 V. Both transformers have no load ratio of 800/400 V. Transformer A is rated at 100 kVA, its total resistance and reactance being 2% and 3% respectively. The rating of the transformer B is 150 kVA, its total resistance and reactance being 1% and 4% respectively. Determine the load on each transformer for a load of 250 kVA at 0.8 pf lagging. **(3)**

Q.2.

(a) A 3 phase 4 wire system simultaneously supplies power at 400 V to a three phase motor load and single phase light loads at 230 V. (i) If the lamps in use require 70, 84 and 33 ampers in each of three lines, what will be the current in the neutral wire? (ii) If the motor now starts taking 200 A from the lines at a power factor 0.2 lagging, what will be the total current in each line and in the neutral wire? Draw current phasor diagram. (iii) Also find the total power supplied to the lamps and motor. **(5)**

(b) Three loads 31+j59, 30-j40 and 80+j60 are connected in delta to a three phase 200 V supply. Find the phase currents, line currents and power absorbed. **(5)**

Q. 3.

(a) A 230 V d. c. shunt motor takes an armature current of 3.4 A at rated voltage and at no load speed of 1000 rpm. The armature and field circuit resistances are 0.4 Ω and 170 Ω. The line current at full load and rated voltage is 41 A. Calculate—
(i) the speed at full load and the developed torque in case the armature reaction weakens the no load flux by 4%.
(ii) the shaft power if rotational losses at no load and full load are same.
(iii) the efficiency of the motor. **(4)**

(b) Derive the expression of the torque produced in a d. c. motor. Draw the torque speed characteristics of different types of motors. (4)

(c) Derive the expression for generated emf in a d. c. generator. (2)

Q.4.

(a) A four pole d. c. machine has an armature of radius 12.5 cm and an effective length of 25 cm. The poles cover 75% of the armature periphery. The armature winding consists of 33 coils, each coil having 7 turns. The coils are accomodated in 33 slots. The average flux density under each pole is 0.75 T.

1). If the armature is lap wound determine- (i) the armature constant, (ii) the induced armature voltage when the armature rotates at 1000 rpm, (iii) the current in the coil and the electromagnetic torque developed when the armature current is 400 A, (iv) the power developed by the armature.

2). If the armature is wave wound repeat above calculations (i) to (iv). The current rating of the coils remains the same as in the lap wound armature. (6)

(b) A 60 kW, 250 V shunt motor takes 16 A when running at no load with speed 1440 rpm. The resistance of armature and field are 0.2 Ω and 125 Ω respectively when hot. Estimate- (i) the efficiency of the motor when taking 152 A. (ii) the effficiency if working as a generator and delivering a load current of 152 A at 250 V. (4)

Q.5.

(a) Obtain the torque equation for single phase reluctance motor. Show the variation of the coil inductance with rotor position. (4)

(b) For an electromagnetic system, show that the mechanical work done is equal to the area enclosed between the two magnetization curves at open and closed positions of the armature and the Ψ-i locus during the armature movement. (3)

(c) Two coils have self and mutual inductances of,

$$L_{11} = L_{22} = \frac{2}{(1+2x)}$$

$$L_{12} = (1-2x)$$

The coil resistances may be neglected.

(a) If the current I_1 is maintained constant at 5A and I_2 at -2A, find the mechanical work done when x increases from 0 to 0.5 m. What is the direction of the force developed?

(b) During the movement in part (a), what is the energy supplied by sources supplying currents I_1 and I_2? (3)

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College of Engineering, Pune
Department of Mathematics
MA 222 Engineering Mathematics IV (For Electrical)
END SEMESTER EXAMINATION

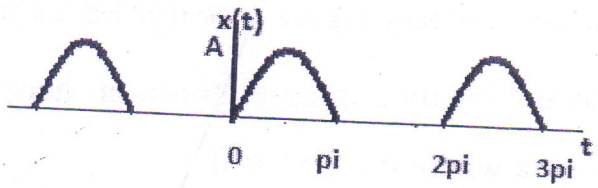
Date:28/04/2011 Max. Marks (50) Max. Time 180 Mins.

SECTION A

Day & Date: –Thursday, 28 April 2011
Maximum Marks: – 50
Time: – 2:00 pm to 5:00 pm
Duration: - 03.00 Hrs

Instructions:-

1. Read all the questions carefully.
2. Use of programmable calculator is strictly not allowed.
3. Assume suitable data where ever necessary.

Q. 1	A)	Consider the analog signal $x_a(t)=3\cos 100\pi t$ (i) Determine the minimum sampling rate to avoid aliasing. (ii) Suppose that the signal is sampled at the rate F_s =75Hz. What is discrete time signal obtained after sampling? (iii) What is the frequency $0<F<F_s/2$ of sinusoid that yields samples identical to those obtained in part (ii)?	(3)
	B)	Find cosine Fourier series of an half wave rectified series sine function. 	(2)
Q. 2	A)	Determine the inverse Z-transform of signal $X(z)=\frac{1}{1-z^{-1}+\frac{1}{2}z^{-2}}$	(3)
	B)	A system is represented by its transfer function, $H(z)=3+\frac{4}{z-\frac{1}{2}}+\frac{z}{z-\frac{1}{4}}$ Give the difference equation realization for this system using direct Form-I and Direct Form-II.	(2)
Q. 3		Determine 16 point DFT of the signal using radix 2 decimation in time FFT algorithm.	(5)

		X(n) = {1,1,1,1,2,1,2,2,2,2,2,1,2,1,1,1}	
Q. 4		An LTIC system is specified by the equation, $$\frac{d^2y(t)}{dt^2} + s\frac{dy(t)}{dt} + 6y(t) = \frac{dx(t)}{dt} + 4x(t)$$ The input is, $x(t) = e^{-t}u(t)$. Find (i) Natural response for the initial conditions $y(0^+) = 3, \frac{dy(0^+)}{dt} = 0$ (ii) Forced response (iii) Total Response	(5)
Q. 5	A)	Find the inverse Laplace transform of $$x(s) = \frac{2+2se^{-2s}+4e^{-s}}{s^2+4s+3} \quad \text{Re(s)} > -1$$	(3)
	B)	Write the relation between DFT and DTFT also write the relation between DFT and 'Z' transform.	(2)

SECTION B

Instructions: All questions are compulsory. Figures on the right indicate max. marks.

1. State and proove Cauchy's integral formula, hence evaluate: $\int_c \frac{e^{2z}}{2z^2 - 4z + 4} dz$ where $c : |z| = 3$ **[4]**

2. Find the Laurent series of $f(z) = \frac{1}{z^2+1}$, about it's singular points, determine the region of convergence. **[4]**

3. Evaluate: $\int_c \frac{1}{\cosh(z)} dz$, $c : |z| = 2$ (use residue theorem).**[4]**

4. Show by the method of residues: $\int_0^{2\pi} \frac{\cos 2\theta}{5 + 4\cos\theta} d\theta = \frac{\pi}{6}$.**[3]**

5. (a) If $P(\chi_n^2 \leq 4.594) = 0.2$ then find n, the degrees of freedom of Chi-square r.v. [1]

(b) A soft drink dispensing machine is said to be out of control if the variance of the contents exceeds 1.15 deciliters. If a random sample of 25 drinks from this machine has a variance of 2.03 deciliters, does this indicate at 0.05 level of significance that the machine is out of control? Assume that the contents are approximately normally distributed. Mention all the steps including figure. [3]

OR

The following data was collected to determine the relationship between pressure and the corresponding scale reading for the purpose of calibration.

$Pressure, x(lb/sq.in.)$	10	10	10	10	10	50	50	50	50	50
$Scalereading, y$	13	18	16	15	20	86	90	88	88	92

Find the equation of regression line and hence find the pressure for a scale reading of 54. [4]

6. It is claimed that an automobile is driven on the average more than 20000 k.ms per year. To test this claim, a random sample of 100 automobile owners are asked to keep a record of the kilometers they travel. Would you agree with this claim if the sample showed an average of 23500 k.m. and a standard deviation of 3900 k.m.? Use 4 percent level of significance.

OR

Compute the correlation coefficient for the following grades of 6 students selected at random:

$MathsGrade$	70	92	80	74	65	83
$EnglishGrade$	74	84	63	87	78	90

Interpret your result. [4]

7. Let D^2 denote the sum of the squares of the deviations from the mean of a random sample consisting of n observations. Assume that the random sample is taken from a population X with mean μ and variance σ^2. Give an unbiased and a biased estimator of σ^2. [2]

NORMAL AREAS (A) AND ORDINATES (y)

$$A = \int_0^x y\,dx$$

x	y	A	x	y	A	x	y	A
.39854	.00000	.00000	.45	.36053	.17364	.90	.26609	.31594
.39851	.00399	.00399	.46	.35889	.17724	.91	.26369	.31859
.39848	.00798	.00798	.47	.35723	.18082	.92	.26129	.32121
.39776	.01197	.01197	.48	.35553	.18439	.93	.25888	.32381
.39862	.01595	.01595	.49	.35381	.18793	.94	.25647	.32639
.39844	.01994	.01994	.50	.35207	.19146	.95	.25406	.32894
.39822	.02392	.02392	.51	.35029	.19497	.96	.25164	.33147
.39797	.02790	.02790	.52	.34849	.19847	.97	.24923	.33398
.39767	.03188	.03188	.53	.34667	.20194	.98	.24681	.33646
.39733	.03586	.03586	.54	.34482	.20540	.99	.24439	.33891
.39695	.03983	.03983	.55	.34294	.20884	1.00	.24197	.34134
.39654	.04380	.04380	.56	.34105	.21226	1.01	.23955	.34375
.39608	.04776	.04776	.57	.33912	.21566	1.02	.23713	.34614
.39559	.05172	.05172	.58	.33718	.21904	1.03	.23471	.34850
.39505	.05567	.05567	.59	.33521	.22240	1.04	.23230	.35083
.39448	.05962	.05962	.60	.33322	.22575	1.05	.22988	.35314
.39387	.06356	.06356	.61	.33121	.22907	1.06	.22747	.35543
.39322	.06749	.06749	.62	.32918	.23237	1.07	.22506	.35769
.39253	.07142	.07142	.63	.32713	.23565	1.08	.22265	.35993
.39181	.07535	.07535	.64	.32506	.23891	1.09	.22025	.36214
.39104	.07926	.07926	.65	.32297	.24215	1.10	.21785	.36433
.39024	.08317	.08317	.66	.32086	.24537	1.11	.21546	.36650
.38940	.08706	.08706	.67	.31874	.24857	1.12	.21307	.36864
.38853	.09095	.09095	.68	.31659	.25175	1.13	.21069	.37076
.38762	.09483	.09483	.69	.31443	.25490	1.14	.20831	.37286
.38667	.09871	.09871	.70	.31225	.25804	1.15	.20594	.37493
.38568	.10257	.10257	.71	.31006	.26115	1.16	.20357	.37698
.38466	.10642	.10642	.72	.30785	.26424	1.17	.20121	.37900
.38361	.11026	.11026	.73	.30563	.26710	1.18	.19886	.38100
.38251	.11409	.11409	.74	.30339	.27035	1.19	.19652	.38298
.38139	.11791	.11791	.75	.30514	.27337	1.20	.19419	.38493
.38023	.12172	.12172	.76	.29887	.27637	1.21	.19186	.38686
.37903	.12552	.12552	.77	.29659	.27935	1.22	.18954	.38877
.37780	.12930	.12930	.78	.29431	.28230	1.23	.18724	.39065
.37654	.13307	.13307	.79	.29200	.28524	1.24	.18494	.39251
.37524	.13683	.13683	.80	.28969	.28814	1.25	.18265	.39435
.37391	.14058	.14058	.81	.28737	.29103	1.26	.18037	.39617
.37255	.14431	.14431	.82	.28504	.29389	1.27	.17810	.39796
.37115	.14803	.14803	.83	.28269	.29673	1.28	.17585	.39973
.36973	.15173	.15173	.84	.28034	.29955	1.29	.17360	.40147
.36827	.15542	.15542	.85	.27798	.30234	1.30	.17137	.40320
.36678	.15910	.15910	.86	.27562	.30511	1.31	.16915	.40490
.36526	.16276	.16276	.87	.27324	.30785	1.32	.16694	.40658
.36371	.16640	.16640	.88	.27086	.31057	1.33	.16474	.40824
.36213	.17003	.17003	.89	.26848	.31327	1.34	.16256	.40988

NORMAL AREAS (A) AND ORDINATES (y)

$$y = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}x^2}$$

$$A = \int_0^x y\,dx$$

x	y	A	x	y	A	x	y	A
1.35	.16038	.41149	1.80	.07895	.46407	2.25	.03174	.48778
1.36	.15822	.41309	1.81	.07754	.46485	2.26	.03103	.48809
1.37	.15608	.41466	1.82	.07614	.46562	2.27	.03034	.48840
1.38	.15395	.41621	1.83	.07477	.46638	2.28	.02965	.48870
1.39	.15183	.41774	1.84	.07341	.46712	2.29	.02898	.48899
1.40	.14973	.41924	1.85	.07206	.46784	2.30	.02833	.48928
1.41	.14764	.42073	1.86	.07074	.46856	2.31	.02768	.48956
1.42	.14556	.42220	1.87	.06943	.46926	2.32	.02705	.48983
1.43	.14350	.42364	1.88	.06814	.46995	2.33	.02643	.49010
1.44	.14146	.42507	1.89	.06687	.47062	2.34	.02582	.49036
1.45	.13943	.42647	1.90	.06562	.47128	2.35	.02522	.49061
1.46	.13742	.42786	1.91	.06439	.47193	2.36	.02463	.49086
1.47	.13542	.42922	1.92	.06316	.47257	2.37	.02406	.49111
1.48	.13344	.43056	1.93	.06195	.47320	2.38	.02349	.49134
1.49	.13147	.43189	1.94	.06077	.47381	2.39	.02294	.49158
1.50	.12952	.43319	1.95	.05959	.47441	2.40	.02239	.49180
1.51	.12758	.43448	1.96	.05844	.47500	2.41	.02186	.49202
1.52	.12566	.43574	1.97	.05730	.47558	2.42	.02134	.49224
1.53	.12376	.43699	1.98	.05618	.47615	2.43	.02083	.49245
1.54	.12188	.43822	1.99	.05508	.47670	2.44	.02033	.49266
1.55	.12001	.43943	2.00	.05399	.47725	2.45	.01984	.49286
1.56	.11816	.44062	2.01	.05292	.47778	2.46	.01936	.49305
1.57	.11632	.44179	2.02	.05186	.47831	2.47	.01889	.49324
1.58	.11450	.44295	2.03	.05082	.47882	2.48	.01842	.49343
1.59	.11270	.44408	2.04	.04980	.47932	2.49	.01797	.49391
1.60	.11092	.44520	2.05	.04879	.47982	2.50	.01753	.49379
1.61	.10915	.44630	2.06	.04780	.48030	2.51	.01709	.49396
1.62	.10741	.44738	2.07	.04682	.48077	2.52	.01667	.49413
1.63	.10567	.44845	2.08	.04586	.48124	2.53	.01625	.49430
1.64	.10396	.44950	2.09	.04491	.48169	2.54	.01585	.49446
1.65	.10226	.45053	2.10	.04398	.48214	2.55	.01545	.49461
1.66	.10059	.45154	2.11	.04307	.48257	2.56	.01506	.49477
1.67	.09893	.45254	2.12	.04217	.48300	2.57	.01468	.49492
1.68	.09728	.45352	2.13	.04128	.48341	2.58	.01431	.49506
1.69	.09566	.45449	2.14	.04041	.48382	2.59	.01394	.49520
1.70	.09405	.45543	2.15	.03955	.48422	2.60	.01358	.49534
1.71	.09246	.45637	2.16	.03871	.48461	2.61	.01323	.49547
1.72	.09089	.45728	2.17	.03788	.48500	2.62	.01289	.49560
1.73	.08933	.45818	2.18	.03706	.48537	2.63	.01256	.49573
1.74	.08780	.45907	2.19	.03626	.48574	2.64	.01223	.49585
1.75	.08628	.45994	2.20	.03547	.48610	2.65	.01191	.49598
1.76	.08478	.46080	2.21	.03470	.48645	2.66	.01160	.49609
1.77	.08329	.46164	2.22	.03394	.48679	2.67	.01130	.49621
1.78	.08183	.46246	2.23	.03319	.48713	2.68	.01100	.49632
1.79	.08038	.46327	2.24	.03246	.48745	2.69	.01071	.49642

College of Engineering, Pune

ELECTROMAGNETIC FIELDS [EE-208]

END SEMESTER EXAM-2011

Branch: Electrical **Total: 50 marks**

S.Y.B.Tech **Time: 3:00hr**

Note:- (i) Write the answers precisely and legibly.

(ii) All questions are compulsory.

(iii) All questions carry equal marks.

Q. 1 Two thin long conducting strips, each of width $2a$ (length $>> 2a$), with their flat surfaces facing each other, are separated by a distance x. Find the capacitance per unit length on the extreme assumption of uniform distribution of charge and then on the extreme assumption of distribution only along the edges. Hence, on the basis of this problem, find whether the edge effects increase or decrease the capacitance of a parallel plate capacitor from its ideal value.

Q. 2 A uniform conducting toroid of rectangular cross-section has the inner radius a, the outer radius b and the axial height h (fig.Q2). A sectorial strip subtending an angle $\frac{\pi}{3}$ is cut and removed from the remaining part of the toroid. If this remaining part is fitted with perfectly conducting strip conductors, find the resistance offered by this part to the flow of a steady current.

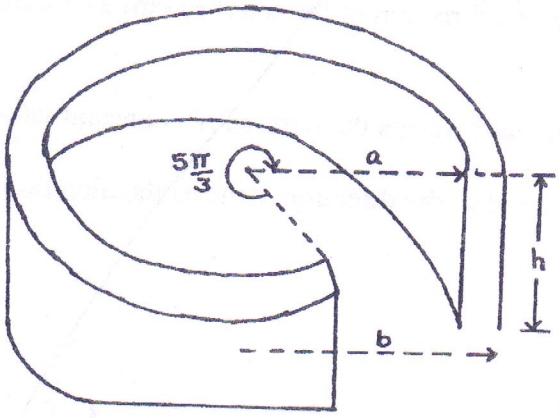


fig.Q2

Q. 3 Two equal charges Q are at the adjacent corners of a square of side a, and an electric dipole of moment m is at a third corner, pointing towards one of the charges. If $m = \sqrt{2}Qa$, find the field strength at the fourth corner of the square.

Q.4 Show that the mutual inductance between a straight long conductor-1 and a coplanar equilateral triangular loop (fig.Q4) is

$$\frac{\mu_0}{\sqrt{3}\pi}\{(a+b)\ln\frac{a+b}{b}-a\}$$

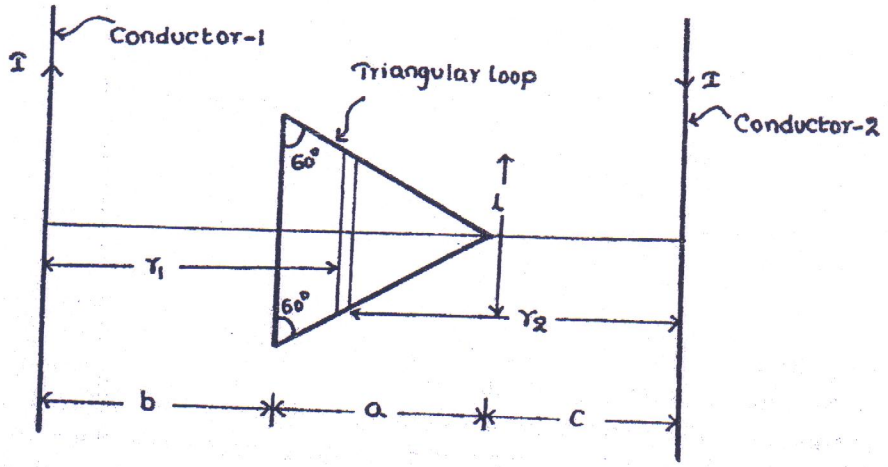


fig.Q4

Q.5 A rectangular loop of size $a \times b$ is located in the field of a long current-carrying straight wire such that the side a is parallel to the wire and the nearer side of the loop is at a distance r_0 from the wire (fig.Q5). **Evaluate**:

(i) The induced emf in the loop if it is fixed in space but the current I (in the wire) varies as $I_0 \cos \omega t$

(ii) The magnitude and the direction of the induced emf as a function of r when $I = I_0$ and constant, but

(a) The loop moves towards the wire with a constant velocity V_0,

(b) The loop moves in the direction same as the direction of current with a constant velocity V_0.

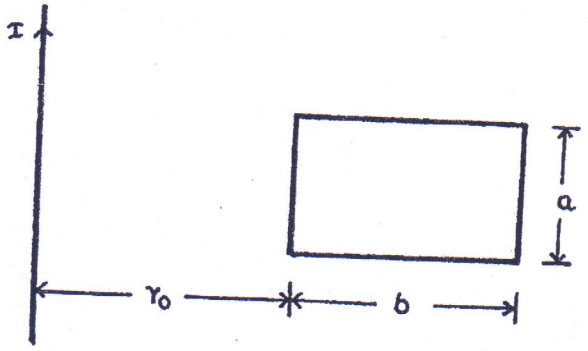


fig.Q5

COLLEGE OF ENGINEERING, PUNE-05

S.Y.B.TECH ELECTRICAL

SUBJECT:-DIGITAL ELECTRONICS AND MICROPROCESSOR FUNDAMENTALS (EE209)

End-Semester Examination-April 2011

Date:-

Max. Marks.-50

Time:-

Duration – 3 hrs

Instructions:-

1. **All questions compulsory**
2. Assume necessary data whenever required.
3. Non programmable calculators are allowed.
4. While writing answers maintain the sequence of questions.
5. Draw neat diagram whenever required.

Q.N. 1 Solve any two of the following

A) Explain working of 4 bit asynchronous up counter 05

B) Explain different data shifting movements in shift registers 05

C) Explain the operation of JK flip flop with truth table in detail 05

Q.N. 2 Solve any two of the following

A) Explain working of R-2R ladder type D/A converter 05

B) Explain working of successive approximation type A/D converter 05

C) Explain quantization and encoding in relation with A/D converter 05

Q.N. 3

A) Differentiate and explain static and dynamic RAM 05

B) Write short note on different types of ROM 05

Q.N. 4 Solve any two of the following

A) Explain different buses and their functions 05

B) What are interrupts. Explain response of microprocessor when interrupt occurs 05

C) Explain different addressing modes 05

Q.N. 5

A) Explain the operation of 1:4 demultiplexer with truth table 05

B) What are different logic families and state their features 05

College of Engineering, Pune

(Class)- S.Y.B.Tech. (Branch)- Electrical

(EE-206)- (Electrical Measurement and Instrumentation)

End_Sem +Quiz 2

Date- 30/04/2011
Academic Year: 2010-2011
Timing: 3 hrs, 20min.
Max. Marks: 50+10

Instructions:

1. All questions compulsory.
2. Q.1 is quiz 2 question.
3. Figures to the right indicate full marks.
4. Assume suitable data wherever necessary.

Q.1: Each of the following questions comprises multiple answers. Select the correct answer. Choose only one answer for each question. Put a √ mark for your answer. **(1: 1 negative mark)** ----- **(10)**

1. Which of the following mechanical devices convert pressure into displacement
   (a) Diaphragms (b) Bellows (c) Bourdon tubes (d) All of these
2. A transducer is a basically a device which converts
   (a) Mechanical energy into electrical energy
   (b) Energy or information from one form to another
   (c) Mechanical displacement into electrical signal
   (d) Electrical energy into mechanical energy.
3. The transducer that converts the input signal into the output signal, which is a continuous function of time is known as
   (a) Active (b) Passive (c) analog (d) Digital
4. The gauge factor is given as
   (a) $G = \frac{\Delta R/R}{\Delta l/l}$ (b) $\frac{\Delta l/l}{\Delta R/R}$
   (c) $G = \frac{\Delta R/R}{\Delta D/D}$ (d) none of the above
5. Platinum is the commonly used metal for resistance-temperature detectors (RTDs) because
   (a) It is commercially available in pure form at reasonable rates
   (b) It is relatively stable under various environment conditions
   (c) It has wide operating temperature range
   (d) All of the above.
6. An LVDT is a
   (a) Variable inductance transducer
   (b) Variable pressure transducer
   (c) Constant displacement transducer
   (d) None of the above.
7. A flow meter that is independent of liquid density is
   (a) Rota meter (b) Electromagnetic flow meter (c) Both (a) & (b) (d) None of the above
8. Loss of charge method is used for measurement of
   (a) Low R (b) High R (c) Low L (d) high L

9. The moving coil in a dynamo meter wattmeter is connected
   (a) In series with fixed coil
   (b) Across the supply
   (c) In series with load
   (d) Across the load
10. Which of the following instrument will require the smallest shunt resistance?
   (a) 0-50 mA (b) 0-10 mA (c) 0-5 mA (d) 0-1 mA

Q.2 A] what is an transducer? What are the basic requirements of a transducer? Give the classification of transducer.

Q.2 B] Are the following transducers active or passive? Why? ----- **(1+2+2)**

i) Resistance strain gauge
ii) Thermocouple
iii) LVDT
iv) Thermistor
v) Hall effect transducer.

Q.3 A] What is a pot? is it a active or passive transducer? Draw neat sketches and describe i) Translatory potentiometer ii) hellipot. ----- **(5)**

Q.3 B] A Schering bridge has the following constants: ----- **(1+1+3)**

R_1 = 1.1 kOhm, C_1= 0.47 microfarad, R_2= 2.2 kOhm, C_3= 0.5 microfarad.
Draw the bridge diagram. If a frequency of 1 KHz is used then determine unknown capacitance and dissipation factor.

Q.4 A] Describe with the help of neat sketches i) bellows ii) diaphragms. ----- **(2+3)**

Q.4 B] The torque of an ammeter varies as the square of the current through it. If a current of 5 A. produces a deflection of 90 degrees, what deflection will occur for a current of 3 A. when the instrument is gravity controlled? ----- **(4)**

Q.4 C] With a neat sketch explain the working of variable reluctance tachometer. ----- **(2)**

Q.5 A] Show that for a wire wound resistance strain gauge, the gauge factor Gf is given by ----- **(4)**

$$Gf \approx 1 + 2\mu$$

Q.5 B] The full scale deflection torque of 10 A. moving iron ammeter is 4 X 10^{-5} Nm. Determine in micro Henry/radian the rate of change of self inductance of the instrument at full scale. ----- **(4)**

Q.5 C] Draw only the neat diagram of LVDT. ----- **(2)**

Q.6 A] What is a Thermistor? Describe with the help of neat sketches the various forms of constructions. ----- **(1+2)**

Q.6 B] A 10 A. electrodynamo meter is controlled by spring having a torsion constant of 0.1 X 10^{-6} Nm/degree. The full scale deflection is 110 degree. Determine the inductance of the instrument when measuring a current of 10 A. The mutual inductance at 0 degree deflection is 2 microhenry and the change in mutual inductance is linear as deflection. ----- **(3)**

Q.6 C] Explain with a block diagram the working of a frequency counter. ----- **(4)**

Best of Luck