

SUBJECT CODE NO:- K-12
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (All Branches) Examination Oct/Nov 2016
Engineering Mathematics -IV
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Questions numbers 1 and 6 are compulsory.
 - ii. Solve any two questions from remaining of each section.
 - iii. Figures to the right indicate full marks.
 - iv. Assume suitable data, if necessary.

Section A

Q.1 Solve any five:- 10

- a) Find the analytic function $f(x) = u + i\vartheta$, whose imaginary part is $\vartheta = \sin hx \cos y$.
- b) Find the harmonic conjugate of $u = 4xy + x + 1$.
- c) Evaluate $\int_0^{1+\pi i} e^z dz$.
- d) Evaluate $\int_{0,1}^{(2,5)} (3x + y)dx + (2y - x)dy$, along $y = x^2 + 1$.
- e) Find the residue of $f(x) = \frac{1}{(z^2-1)^3}$ at each pole.
- f) Find the image of the circle $|Z| = 1$, under the transformation $W = \log z$.
- g) Solve $\frac{\partial^2 u}{\partial x^2} = 0$, where $u(0, y) = y^2$, and $u(l, y) = 1$.

OR

Find the z- transform of $K^2, K \geq 0$.

- h) Solve $\frac{\partial u}{\partial x} = 4 \frac{\partial u}{\partial y}$, where $u(x, 0) = 4e^{-x}$.

OR

Find the z – transform of $f(K) = 4^K, K < 0$
 $= 3^K, K \geq 0$ Q.2 a) If $u = a(1 + \cos\theta)$, find ϑ so that $u + i\vartheta$ is analytic. 05b) Evaluate $\int_c \frac{(e^z \sin 2z - 1)}{z^2(z+2)^2} dz$ where c is $|z| = \frac{1}{2}$. 05c) Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$, subject condition $u(0, y) = 0, u(\pi, y) = 0, u(x, 0) = 100$ and $u(x, \infty) = 0$ 05

OR

Find the z- transform of $\sin h \frac{K\pi}{2}$. 05Q.3 a) Show that $u = e^x \cos y + x^2 - y^2$ is harmonic. Find harmonic conjugate, also find corresponding analytic function. 05b) Evaluate $\int_c \frac{z+2}{z} dz$, where c is left half of the circle $|Z| = 2$. 05c) Solve $\frac{\partial^2 y}{\partial t^2} = a^2 \frac{\partial^2 y}{\partial x^2}$, subject to the conditions $y(0, t) = y(l, t) = 0, y(x, 0) = 0$ and $\left(\frac{\partial y}{\partial t}\right)_{t=0} = \lambda x(l - x)$. 05

OR

Find the inverse Z – transform of $\frac{z^2}{z^2+9}$ 05Q.4 a) Find the image of the circle $|Z-3| = 5$ under the transform $W = \frac{1}{Z}$. 05b) Evaluate $\oint_C \frac{2Z+1}{Z^2-Z-2} dz$, where C is $|Z| = 3$, by Cauchy residue theorem. 05c) Solve $\alpha^2 \frac{\partial^2 u}{\partial x^2} = \frac{\partial u}{\partial t}$, with the boundary conditions $\frac{\partial u}{\partial x}(0, t) = 0, \frac{\partial u}{\partial x}(l, t) = 0$ and $u(x, 0) = Kx$. 05

OR

Solve $Y_{K+1} - Y_{K-1} = u(k), y(0) = 0$, by Z- transform. 05Q.5 a) Find the bilinear transformation which maps the points $Z=0, -i, 2i$ into the points $W= 5i, \infty, \frac{-i}{3}$ respectively. 05b) Expand $f(z) = \frac{z^2-1}{(z+2)(z+3)}$ in a Laurent's series for $2 < |Z| < 3$. 05c) Evaluate $\int_0^{2\pi} \frac{d\theta}{13+12\cos\theta}$, by residue theorem. 05

Section B

- Q.6 Solve any five:- 10
- Find the Laplace transform of $\frac{\sin 4t}{t}$.
 - Find the Laplace transform of $\left[\frac{d}{dt} (t^3 e^{-3t}) \right]$.
 - Find the Laplace transform of $[a \cos^2 2bt]$.
 - Find the inverse Laplace transform of $\frac{1}{s} \left(\frac{s-a}{s+a} \right)$.
 - Find the inverse Laplace transform of $\left[\frac{s}{(2s+1)^2} \right]$.
 - Find the inverse Laplace transform of $\frac{se^{-2s}}{s^2+25}$.
 - Find $f(x)$, if its Fourier sine transform is $e^{-a\lambda}$.
 - Find the Fourier transform of

$$f(x) = \begin{cases} 0, & \infty < x < a \\ = x, & a \leq x \leq b \\ = 0, & x > b \end{cases}$$
- Q.7 05
- Evaluate $\int_0^\infty \frac{e^{-t} \sin \sqrt{3t}}{t} dt$.
- Q.7 05
- Find the inverse Laplace transform of $\frac{1}{2s} \log \left(\frac{s^2+36}{s^2+16} \right)$.
- Q.7 05
- Solve $\frac{\partial u}{\partial t} = K \frac{\partial^2 u}{\partial x^2}$, subject to the conditions
 - $u=0$, when $x=0, t \geq 0$
 - $u = e^{-ax}$, when $t=0, x > 0$ and
 - $u(x, t)$ is bounded.
- Q.8 05
- Find the Laplace transform of $e^{4t} \int_0^t t \cos t dt$.
- Q.8 05
- Find inverse Laplace transform of $\frac{s}{s^4+8s^2+16}$ by convolution theorem.
- Q.8 05
- Find the Fourier sine transform of $\cos hx - \sin hx$.
- Q.9 05
- Find the Laplace transform of periodic function. $f(t) = \left(\frac{\pi+t}{2} \right)^2, 0 < t < 2\pi$ and $f(t) = f(t + 2\pi)$.
- Q.9 05
- Solve $\frac{d^2y}{dt^2} - 6 \frac{dy}{dt} + 9y = t^2, e^{3t}, y(0) = 2, y'(0) = 6$ by Laplace transform method.
- Q.9 05
- Solve the integral equation $\int_0^\infty f(x) \sin px dx = 1 - p, 0 \leq p \leq 1$
 $0, p > 1$
- Q.10 05
- Express the following function in terms of Heaviside unit step function and hence find their Laplace transform.

$$f(t) = \begin{cases} (t-a)^4, & t > a \\ = 0, & 0 < t < a \end{cases}$$
- Q.10 05
- Solve $\frac{dx}{dt} + y = 0, \frac{dy}{dt} - x = 0, x(0) = 1, y(0) = 0$
- Q.10 05
- Find the Fourier transform of $f(x)$, where

$$f(x) = \begin{cases} \cos x, & \text{if } 0 < x < 1 \\ = 0, & \text{Otherwise.} \end{cases}$$

SUBJECT CODE NO:- K-38
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(I&CE/IE) Examination Oct/Nov 2016
Digital Electronics & Microprocessor
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q. No. 1 & Q. No. 6 is compulsory. Attempt any two question from remaining from each section.
 - ii) Assume suitable data, if necessary.
 - iii) Figures to right indicate full marks.

Section A

- Q.1 Attempt any five 10
- a) Draw truth table off OR gate
 - b) What is don't care condition in Boolean logic
 - c) Hat is SOP related to K map
 - d) What is multiplexer
 - e) What is decoder
 - f) What is shift register
 - g) State difference between timer & counter
 - h) What is function of ALE pin in 8085
- Q.2 08
- a) With neat diagram explain the realization of full subs tractor, also draw truth table.
 - b) What is shift register? State & explain classification of shift register? 07
- Q.3 10
- a) Simplify the logic expression 10
 $F(A,B,C,D,E)=\sum m(0,5,6,8,9,10,11,16,20,24,25,26,27,29,31)$
Using k-map
 - b) What is difference *betⁿ* JK flip flop and Master-slave JK flip flop, explain in brief. 05
- Q.4 State and explain various addressing modes of 8085 microprocessors in detail with suitable examples. 15
- Q.5 Write short note on:- 15
- a) D- Flip Flop
 - b) BCD to 7 segment decoder
 - c) Full adder

Section – B

- Q.6 Attempt any five:- 10
- a) What is role of Flag registers in 8085 microprocessor
 - b) What is significance of interrupt? Give its classification
 - c) What is hand shaking mode related 8255 PPI
 - d) What is memory decoding technique
 - e) List out interrupts in 8085 μ p starting from highest priority to lowest priority.
 - f) Enlist various features of 8085 μ p
 - g) Give any four instructions from logical instruction category.
 - h) What is assembler?
- Q.7 a) Compare the action of microprocessor 8085 for the following pairs of instruction:- 08
- (i) MVI A, 00H/ XRA A
 - (ii) LDA 2400 H and LHLD 2400 H
 - (iii) SUB. B and CMP B
 - (iv) RLC and RAL
- b) Draw the timing diagram of MOV R₁, R₂ instruction. 07
- Q.8 a) Interface 2k bytes of memory to 8085 microprocessor with starting address 8000 H, use decoder IC. 08
- b) Write a program to transfer a block of data. The data is stored in memory from C550 H to C55FH. 07
The data is to be stored from C570H to C57FH.
- Q.9 a) With the neat diagram explain interfacing scheme of 8 bit DAC 0808 to an 8085 μ p using 8255. 08
- b) With neat block diagram explain 8085 interrupt structure. 07
- Q.10 Write short notes on:- 15
- a) Control word of 8255 PPI
 - b) Features of 8253 programmable timer
 - c) Serial data transfer

SUBJECT CODE NO:- K-68
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(I&CE/IE) Examination Oct/Nov 2016
Electrical Machines
(Revised)

[Time:Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Q.No.1 and Q.No.6 are compulsory.
- ii) Attempt any two questions from the remaining questions from both sections.
- iii) Figure to right indicates full marks.
- iv) Assume suitable data wherever necessary.

Section- A

- Q.1 Attempt any Five 10
- a) State methods of speed control in D.C motor.
 - b) List out applications of 3 phase induction motor.
 - c) How will you change direction of D.C. motor
 - d) State emf equation of DC generator.
 - e) Give the classification of 3 phase Induction Motor.
 - f) Enlist types of starters for three phase induction motor.
 - g) Enlist methods to make single phase induction motor self starting.
 - h) What are advantages of salient pole type of construction used for synchronous machine?
- Q.2 a) Derive an expression for torque developed in d.c motor. 07
- b) Explain in detail, effect of armature reaction in DC shunt generator. 08
- Q.3 a) Explain how rotating magnetic field is produced in 3 phase Induction motor. 08
- b) A 250 v shunt motor on no load runs at 1000 rpm & takes 5A. Total armature & shunt field resistance are respectively 0.2Ω & 250Ω . 07
Calculate the speed when loaded and taking a current of 50 A if armature reaction weaker He field by 3% .
- Q.4 a) With neat diagram explain the construction & working of Direct online starter. 08
- b) A 3ϕ , 50 Hz, 4 –pole induction motor has a slip of 4%. 07
Calculate – i) speed of motor
ii) Frequency of rotor emf
- Q.5 Write short note on- 15
- a) Flemings right hand rule
 - b) 4 point starter
 - c) Load characteristics of DC shunt generator.

Section – B

- Q.6 Attempt any five – 10
- a) What does hunting of synchronous motor mean?
 - b) Write application of synchronous motor.
 - c) What is difference between accuracy and precision?
 - d) Define reproducibility of instrument.
 - e) Enlist various recording instrument.
 - f) Explain significance of damping torque.
 - g) State constructional difference between moving vane type and Double vane type instrument.
 - h) Draw moving iron instrument as a voltmeter.
- Q.7 a) What are instrumental & Environmental errors ? How can they be avoided? 08
- b) What is synchronous condenser, explain in detail. 07
- Q.8 a) With neat diagram, explain the working principle of synchronous motor . 08
- b) Mention some specific application of synchronous motor & explain in detail. 07
- Q.9 a) Describe the construction & operation of permanent magnet moving coil instrument in detail with neat Diagram. 08
- b) Discuss the various application of Megger. 07
- Q.10 Write short note on – 15
- a) X-Y recorder
 - b) CT & PT transformer
 - c) Dynamometer type Wattmeter.

SUBJECT CODE NO:- K-98
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (I&CE/IE) Examination Oct/Nov 2016
Sensors Technology-II
(Revised)

[Time:Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q. No. 1 & Q. No. 6 are compulsory.
 - ii) Attempt any two questions from each section.
 - iii) Give illustration, Supporting the Answer.

SECTION A

- Q.1 Answer the following (any Five) 10
- i. What do you mean by stagnation pressure?
 - ii. What are the types of orifice plates?
 - iii. How do we reduce the pressure head loss in ventury meter.
 - iv. How do float measures level.
 - v. How do we measures density of Gas.
 - vi. What do you mean by square root relationship?
 - vii. What do you mean by Laminar and turbulent flow?
 - viii. What is Viscosity?
- Q.2 a) Describe positive displacement flow meters with its construction and working. 08
b) What is displacer? How do it measures liquid level. 07
- Q.3 a) Explain pilot tube to show relationship 08
- $$V = \frac{\sqrt{2(P_{static} - P_{stagnation})}}{\rho}$$
- b) Explain ultrasonic techniques for level measurement. 07
- Q.4 a) Explain chain balanced float for density measurement. 08
b) How do you measure open Chanel flow wing notches & weirs. 07
- Q.5 Write short notes. 15
- i. Rotameter
 - ii. Dahl tube
 - iii. Air bubbler.

SECTION B

Q.6	Answer the following (any five)	10
	i. What is Nernst equation	
	ii. What is hygrometer?	
	iii. What is buffer solution	
	iv. How do you measure thickness	
	v. What is AC & DC tachometer	
	vi. How do rotameter measures viscosity.	
	vii. What do you mean by Psychometric chart	
	viii. Explain solid stale electrodes.	
Q.7	a) Describe on line PH meters. With all its essentials.	08
	b) How do you determine relative humidity by any of the techniques?	07
Q.8	a) Distinguish acceleration and vibrations. Explain any one technique of accelerometer.	08
	b) Explain capillary technique for viscosity measurement.	07
Q.9	a) Explain construction and working of Hall transducer.	08
	b) Explain conductivity measurement technique on the basis of – Conductivity cell, Excitation circuit, effect of Temperature, conductivity water.	07
Q.10	Write short notes.	15
	i) Photo electric counter.	
	ii) Gyroscope	
	iii) Psychometer	

SUBJECT CODE NO:- K-165
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(I&CE/IE) Examination Oct/Nov 2016
Linear Integrated Circuits & Application
(Revised)

[Time:Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Attempt three questions from each section.
 - ii) Q.No.1 from section A & Q.No.6 from section B are compulsory.
 - iii) Figures to the right indicate full marks.

Section A

- | | | |
|-----|--|----------|
| Q.1 | Attempt <u>any five</u> . | 10 |
| | <ul style="list-style-type: none">i) Define Op-Amp.ii) What is frequency response?iii) Give the pin configuration of Op-Amp 741.iv) What is circuit stability?v) Give the comparison between positive & negative feedback.vi) Enlist various packages of IC's?vii) Define slew rate.viii) Define input offset voltage.ix) What is thermal drift?x) Comment in brief on device identification. | |
| Q.2 | <ul style="list-style-type: none">a) Draw block diagram of Op-Amp & explain.b) An inverting amplifier having $R_f=4.7k\Omega$, $R_1=470\Omega$, $A=20 \times 10^4$, $R_i=2M\Omega$, $R_o=75\Omega$ & $f_0=5Hz$. The supply voltage & output voltage swing are $\pm 15v$ & $\pm 13v$ of an 741 Op-Amp. Determine A_f, R_{if}, R_{of} V_{OOT} & F_f. | 07
08 |
| Q.3 | <ul style="list-style-type: none">a) Derive an expression for gain of non-inverting amplifier.b) Discuss various compensating networks used as in Op-Amp circuits with its features. | 07
08 |
| Q.4 | <ul style="list-style-type: none">a) Explain various feedback consignations giving significance of negative feedback.b) Discuss significance of Op-Amp data sheet. | 07
08 |
| Q.5 | Write notes on. <ul style="list-style-type: none">a) Voltage follower.b) Ideal Op-Amp.c) Differential Op-Amp with one Op-Amp. | 15 |

Section B

- Q.6 Attempt any five. 10
- i) What are the two requirements for oscillations?
 - ii) What is voltage regulator?
 - iii) What do you mean by clipper?
 - iv) What is filter? Give its classification?
 - v) What is peak detector?
 - vi) What is comparator?
 - vii) What do you mean by integrator?
 - viii) What is voltage inverter? Give its two applications.
 - ix) What is voltage controlled oscillator?
 - x) What is the difference between scaling & averaging?
- Q.7 a) With a neat circuit diagram. Explain DC & Ac amplifier. 07
a) Discuss in detail differentiator. 08
- Q.8 a) With the help of neat circuit explain notch filter. 07
b) Explain in detail RC phase shift oscillator. 08
- Q.9 a) With the help of neat diagram explain operation of Schmitt trigger. 07
b) Discuss in detail sample & hold circuit. 08
- Q.10 Write notes on. 15
- a) PLL.
 - b) Clamper.
 - c) Scaling & averaging amplifier.

SUBJECT CODE NO:- K-185
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(ALL-BRANCHES) Examination Oct/Nov 2016
Engineering Mathematics - III
(Revised)

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Q.No.1 and Q.No.6 are compulsory.
 - ii. Solve any two out of Q. 2, 3, 4 & 5.
 - iii. Solve any two out of Q. 7, 8, 9& 10.
 - iv. Use of Non-programmable calculator is allowed.
 - v. Figures to the right indicate full marks.
 - vi. Assume suitable data, if necessary.

Section A

Q.1 Solve any five

10

- a) Find C.F. of $\frac{d^2x}{dt^2} + 3a\frac{dx}{dt} - 4a^2x = 0$
- b) Solve $(D^3 - 3D^2 + 3D - 1)y = 0$
- c) Find P.I of $(D + 2)(D - 1)^2y = e^{-2x}$
- d) Find P.I of $(D^2 - 4)y = x^2$
- e) If the probability of a defective mobile phone is 0.2, find the
 - I. Mean
 - II. The standard deviation for the distribution of mobile phones in a total of 200.
- f) Suppose 3% of bolts made by machine are defective the defects occurring at random during production if bolts are packaged 50 per box find Poisson approximation to it that a given box will contain 5 defectives.
- g) There is no skewness in the distribution if -----.
- h) Draw the electrical circuit that gives damped free oscillations.

Q.2

- a) Solve $(D^2 + 13D + 36)y = e^{-4x} + \cos 2x$
- b) Find the Karl Pearson's coefficient of skewness for the following

05

05

Years under	10	20	30	40	50	60
No. of persons	15	32	51	78	97	109

- c) An alternating $emfE \sin \omega t$ is applied to an inductance L and capacitance C in series. Show that ,the current in the circuit is $\frac{EW}{(n^2-w^2)L} (\cos wt - \cos nt)$ where $\eta^2 = \frac{1}{LC}$

05

Q.3

- a) Solve by method of variation of parameters. $(D^2 + 2D + 1)y = 4e^{-x} \log x$
- b) Apply the method of the least squares to fit a parabola $y = a + bx + cx^2$ for the data.

05

05

X	-1	0	0	1
Y	2	0	1	2

- c) Solve $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \sin(\log x^2)$

05

- Q.4 a) An underground mine has 5 pumps installed for pumping out storm water. The probability of any one of the pumps failing during the storm is $\frac{1}{8}$. what is the probability that
- At least 2 pumps will be working
 - All pumps will be working during a particular storm.
- b) A body executes damped forced vibrations given by the equation $\frac{d^2x}{dt^2} + 2K \frac{dx}{dt} + b^2x = e^{-kt} \sin wt$. solve the equation for both the cases, when $w^2 \neq b^2 - k^2$ and $w^2 = b^2 - k^2$.
- c) Solve $(2x + 1) \frac{d^2y}{dx^2} - \frac{dy}{dx} + \frac{y}{2x+1} = \frac{3x+4}{2x+1}$

- Q.5 a) The first four moments of a distribution about the value 4 of the variable are $-1.5, 17, -30$ and 108 . Calculate the first four moments about the mean and find β_1 and β_2 .
- b) Solve the equation $EI \frac{d^2y}{dx^2} + Py = \frac{-wl^2}{8} \sin\left(\frac{\pi x}{l}\right)$ for a strut of length 'l' freely hinged at each end. Prove that the deflection y at the centre is $\frac{wl^2}{8(Q-P)}$ where $Q = \frac{EI\pi^2}{l^2}$
- c) Solve by general method $(D^2 + 3D + 2)y = e^{e^x}$

Section – B

- Q.6 Solve any five
- Find the first approximate value of the root (ie. x_1) by Newton – Raphson method for $\log_e x - x + 3 = 0$.
 - Find the values of x, y, z in the first iteration by Gauss Seidel Method for

$$8x + 3y + 2z = 13$$

$$x + 5y + z = 7$$

$$2x + y + 6z = 9$$
 - Find f(1) for data

X	0	2	3
F(x)	-4	2	14
 - Find grad ϕ at $(1,1,-1)$ if $\phi = e^{2x-y+z}$.
 - Prove that $\vec{F} = (y^2 \cos x + z^3)i + (2y \sin x - 4)j + (3xz^2 + 2)k$ is conservation field.
 - If $\vec{A}(t) = ti - t^2j + (t - 1)k$
 $\vec{B}(t) = 2t^2i + 6tk$
 Evaluate $\int_0^2 \vec{A} \cdot \vec{B} dt$.
 - If $\vec{r} = xi + yj + zk$ then find $\nabla \cdot \vec{r}$.
 - Write formula of Runge Kutta IVth order method to solve $\frac{dy}{dx} = f(x, y), y(x_0) = y_0$

- Q.7 a) Find the root of the equation $e^{-x} - x = 0$ by Newton –Raphson method (correct to three decimal places).
- b) Find the directional derivation of $\phi = xy^2 + yz^3$ at the point $(2,-1, 1)$ in the direction of the normal to the surface $x \log z - y^2 = -4$ at $(-1,2,1)$.
- c) If $\vec{F} = (5xy - 6x^2)i + (2y - 4x)j$, evaluate $\int_C \vec{F} \cdot d\vec{r}$ along the curve C in $x - y$ plane, $y = x^3$ from the point $(1, 1)$ to $(2, 8)$.

- Q.8 a) Solve by Gauss Seidel method
- $$28x + 4y - z = 32$$
- $$x + 3y + 10z = 24$$
- $$2x + 17y + 4z = 35$$

- b) Verify Green's theorem for $\vec{F} = x^2i + xyj$ and C is a triangle having vertices A (0, 2), B (2, 0) and C (4, 2). 05
 c) Find $\nabla^4(e^r)$. 05

- Q.9 a) Given that $\frac{dy}{dx} = 2 + \sqrt{xy}$ and $y(1)=1$ find approximate value of y at $x = 1.2$ using Euler's modified method (take $h = 0.2$) 05
 b) Use Lagrange's interpolation to find the value of y when $x=10$ for the data given below. 05

X:	5	6	9	11
Y:	12	13	14	16

- c) Using stoke's theorem evaluate $\int_C [(x + y) + (2x - z)dy + (y + z)dz]$ where C is the boundary of the triangle with vertices (2,0,0) (0,3,0) and (0,0,6). 05

- Q.10 a) Evaluate $\int_C \vec{F} \cdot d\vec{s}$ where $\vec{F} = yi + xj + z^2k$ over the cylindrical region bounded by $x^2 + y^2 = 9, z = 0$ and $z = 2$. 05
 b) From the following table find the value of $\frac{dy}{dx}$ at $x = 2.03$. 05

X:	1.96	1.98	2.00	2.02	2.04
Y:	0.7825	0.7739	0.7651	0.7563	0.7473

- c) Use fourth order Runge Kutta method to find y at $x = 0.1$ given that $\frac{dy}{dx} = 3e^x + 2y, y(0) = 0$ and $h = 0.1$. 05

SUBJECT CODE NO:- K-313
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(I&CE/IE) Examination Oct/Nov 2016
Basic Instrumentation
(Revised)

[Time:Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q.No.1 and Q.No.6 are compulsory.
 - ii) Attempt any two questions from each section from remaining.
 - iii) Assume suitable data if necessary.

Section A

- Q.1 Attempt any five. (brief answer) 10
- a) Define drift? Mention their types.
 - b) Explain the phenomenon of hysteresis in measurement system.
 - c) Define transfer function.
 - d) What is loading effect?
 - e) Difference between series and shunt type ohmmeter.
 - f) Mention the types of potentiometer.
 - g) What is calibration?
 - h) Write principle of galvanometer.
- Q.2 08
- a) Explain with neat diagram Crompton's potentiometer.
 - b) Obtain torque equation of a galvanometer. 07
- Q.3 08
- a) Explain static characteristics of instruments.
 - b) With neat diagram explain basic slide wire potentiometer. 07
- Q.4 08
- a) Explain the construction of electro-dynamometer type wattmeter.
 - b) With circuit explain analysis of voltmeter multipliers. 07
- Q.5 08
- a) Explain with diagram construction and working of inductance type single phase energy meter.
 - b) A moving coil instrument gives full scale deflection of 10MA. When the potential difference across its terminals is 100mv. Calculate 07
 - a) The shunt resistance for a full scale deflection corresponding to 100A.
 - b) The series resistance for full scale reading with 1000v. Calculate power dissipation in each case.

Section B

- Q.6 Attempt any five. (brief answer) **10**
- a) Define the null as it applies to bridge measurement.
 - b) State the function of attenuator in CRO.
 - c) What are writing systems used in recorder?
 - d) Where is the spectrum analyses used?
 - e) Define slip gauges.
 - f) Applications of CT and PT.
 - g) How are phase and amplitude measured in CRO?
 - h) What is the necessity of recorder?
- Q.7 a) Derive the equation for balance in the case of Schering Bridge. Draw the phasor diagram for balance condition. **08**
- b) Explain the application of a. c bridge. **07**
- Q.8 a) Obtain the balance condition for Kelvin Bridge. **08**
- b) Explain basic standard signal generator. **07**
- Q.9 a) Explain with neat diagram CRT. **08**
- b) Explain calibration of wattmeter with d. c potentiometer. **07**
- Q.10 a) With neat sketch explain vernier calliper. **08**
- b) List out different gauges used in mechanical measurements and explain. **07**

SUBJECT CODE NO:- K-215
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(I&CE/IE) Examination Oct/Nov 2016
Sensor Technology-I
(Revised)

[Time: Three Hours]

[Max. Marks:80]

N.B Please check whether you have got the right question paper.

- i) Solve three questions from each section.
- ii) Q.No.1 from section A and Q.No.6 from section B are compulsory.
- iii) Give illustration's if necessary

Section- A

- | | | |
|-----|--|---|
| Q.1 | Answer any five | 10 |
| | <ul style="list-style-type: none">a) What is gauge factor?b) What are the properties of gauge wire?c) How do the potentiometers work?d) What is load cell? Give its types?e) What are the properties of elastic materials?f) How do you distinguish soft & hard magnetic materials?g) What are the types of manometers?h) Write scale conversion formulae for temperatures. | |
| Q.2 | <ul style="list-style-type: none">a) What are encoders? Explain the application of digital encoding system.b) Explain the strain gauge giving its classification. What is the role of gauge factor in its working? | <ul style="list-style-type: none">0708 |
| Q.3 | <ul style="list-style-type: none">a) What are the different types of filled system thermometer? Explain each type in brief.b) Discuss in detail bulk modulus cell for pressure measurement. | <ul style="list-style-type: none">0708 |
| Q.4 | <ul style="list-style-type: none">a) What is LVDT? Explain its working with a neat diagram.b) State the properties of magnetism. | <ul style="list-style-type: none">0708 |
| Q.5 | Write short notes (any three) <ul style="list-style-type: none">a) Flopper nozzleb) Magnetic shieldingc) Thermocoupled) Proximity sensors | 15 |

Section-B

- Q.6 Answer any five 10
- a) Define diamagnetism & ferromagnetism.
 - b) List out applications of encoders.
 - c) List out noncontact types of temperature transducer.
 - d) What is proximity sensor?
 - e) What do you mean by cold junction compensation?
 - f) What is the importance of SAMA in filled systems used in temperature measurement?
 - g) How leak detector works?
 - h) What is the significance of thermopile?
- Q.7 a) Explain how strain gauge is used for torque measurement. 07
- b) Explain the method of smoke detection. 08
- Q.8 a) With the help of neat block diagram explain electronic load cell. 07
- b) Explain force measurement system using LVDT. 08
- Q.9 a) Discuss the properties & selection materials for thermocouple. 07
- b) What is dead-weight tester? Explain its working. 08
- Q.10 Write short notes on (any three) 15
- a) Superconducting materials
 - b) RTD
 - c) Torsion bar
 - d) Thermopiles

SUBJECT CODE NO:- K-246
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(I&CE/IE) Examination Oct/Nov 2016
Electronic Devices & Circuits
(Revised)

[Time:Three Hours]

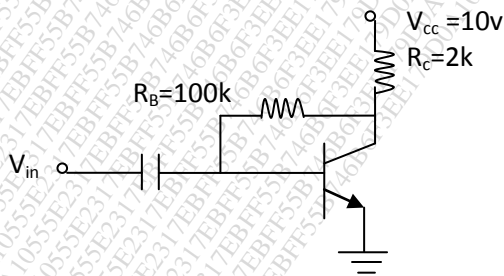
[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q.No.1 & 6 are compulsory.
 - ii) Solve any two questions from the remaining questions from each section A & B.
 - iii) Assume suitable data if necessary.

Section A

- | | | |
|-----|--|----------|
| Q.1 | Solve <u>any five</u> from the following. | 10 |
| | <ol style="list-style-type: none"> i) Explain in brief Shockley diode. ii) Write types of transistor biasing. iii) Draw frequency response of transistor amplifier. iv) What is the necessity of data sheet? v) What are the applications of JFET? vi) What do you mean by small signal amplifiers? vii) Explain how a reverse biased PN junction exhibits a capacitor. | |
| Q.2 | <ol style="list-style-type: none"> a) Draw experimental set-up for VI characteristics of diode & explain its VI characteristics. b) Explain tunnel diode in detail. | 07
08 |
| Q.3 | <ol style="list-style-type: none"> a) Explain construction & working of IGBT. b) Explain in detail stability factor & thermal runaway in detail. | 08
07 |
| Q.4 | <ol style="list-style-type: none"> a) Explain transformer coupled amplifier. b) What do you mean by multistage amplifiers? Why it is necessary? Explain cascade multistage amplifier. | 08
07 |
| Q.5 | a) For the circuit shown in fig. Calculate I_B , I_C & I_E if S_i transistor is used with $\beta=50$ & stability factor 5. | 08 |



- b) The datasheet of a certain JFET indicates that I_{DSS} equal to 15mA and V_{GS} (off) equal to 5V. Determine the drain current for V_{GS} equal to 0V, -1V, -4V. 07

Section B

- Q.6 Solve any five from the following. 10
- i) What is wide band amplifier?
 - ii) What is the condition for oscillations?
 - iii) Draw the circuit of complementary symmetry push pull amplifier.
 - iv) Write applications of photo diode.
 - v) Differentiate amplifier & power amplifier.
 - vi) What is line regulation?
 - vii) Explain working principle of LDR.
- Q.7 a) Explain FET oscillator in detail. 08
b) Explain colpitt's oscillator. 07
- Q.8 a) A power amplifier has a collector efficiency of 50% & operated from 20V supply. If the output power is 3.5w, what is the total power dissipated within the circuit. 08
b) Explain direct coupled push pull amplifier. 07
- Q.9 a) Draw & explain transistor series regulator. 08
b) Explain the construction of UJT. 07
- Q.10 a) Explain current shunt feedback amplifier. 08
b) Explain Class-A amplifier with its waveforms. 07

SUBJECT CODE NO:- K-279
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(I&CE/IE) Examination Oct/Nov 2016
Network Theory
(Revised)

[Time:Three Hours]

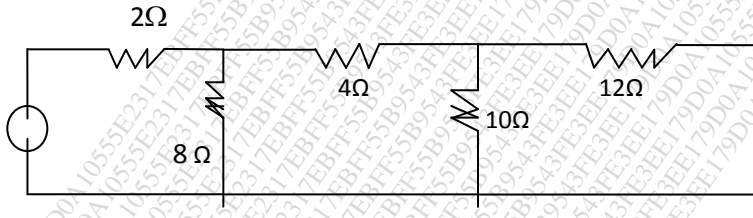
[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B
- I. Question No.1 and Q.No.6 are compulsory.
 - II. Solve three questions from each section.

Section A

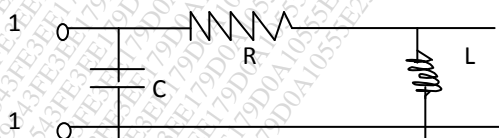
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|-----|--|----------|
| Q.1 | Solve (any Two). | 10 |
| | <ol style="list-style-type: none"> a) State and prove norton theorem. b) Explain star-Delta network transformations. c) state and explain Integration property of Laplace transform. d) Discuss properties of driving point impedance. | |
| Q.2 | <ol style="list-style-type: none"> a) State and prove Thevinion theorem b) Calculate current through 10 Ω resistance using Thevinions theorem. | 07
08 |



- | | | |
|-----|--|----------|
| Q.3 | <ol style="list-style-type: none"> a) How Y-parameters are converted to Z-parameter. b) Explain poles and zeros? Explain their importance in network analysis. | 07
08 |
| Q.4 | <ol style="list-style-type: none"> a) Assume a delta network and convert it in star network. b) Explain tree, co-tree and cutset matrices with example. | 07
08 |
| Q.5 | Write short note on <ol style="list-style-type: none"> a) Butterworth filter. b) Staibility network. c) Superposition Theorem. | 15 |

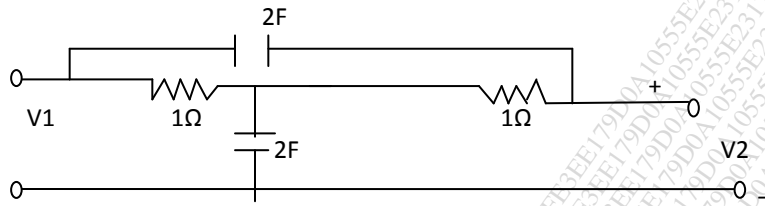
Section B

- | | | |
|-----|---|----|
| Q.6 | Solve (Any two). | 10 |
| | <ol style="list-style-type: none"> a) Explain Network topology with example. b) State and explain transfer function of a network. c) Explain different types of analog filter with their frequency response. | |
| Q.7 | a) Find driving point impedance of following network. | 07 |



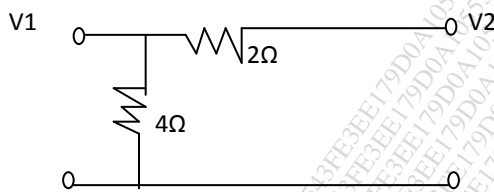
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|----|-------------------------------------|----|
| b) | State and prove Reciprocity Theorm. | 08 |
|----|-------------------------------------|----|

Q.8 a) Find the network function? $Z_{11}(s)$ and $Z_{21}(s)$ for following network. 07



b) Design a low pass RC filter with cut-off frequency 70Hz and evaluate. 08

Q.9 a) Find Z-parameter and y-parameter for following circuit. 08



b) Explain Hurwitz criteria. 07

Q.10 Solve (any Three). 15

- a) Analog filter design.
- b) Waveforms Synthesis.
- c) Convolutions Integral.
- d) Maximum power Transfer Theorem.