Total No. of Printed Pages:2

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. 05

b) Evaluate $\int_c \frac{(e^z sin2z-1)}{z^2(z+2)^2} dz$ where c is $|z| = \frac{1}{2}$. 05

c) 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,∞)=0 05

OR

Find the z- transform of $\sin h\frac{K\pi}{2}$. 05

Q.3 a) Show that $u = e^x cosy + x^2 - y^2$ is harmonic. Find harmonic conjugate, also find corresponding analytic function. 05

b) Evaluate $\int \frac{z+2}{z} dz$, where c is left half of the circle |Z| =2. 05

c) 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 $\frac{z^2}{z^2+9}$ 05

Q.4 a) Find the image of the circle |Z-3| = 5 under the transform W=$\frac{1}{Z}$. 05

b) Evaluate $\oint_c \frac{2Z+1}{Z^2-Z-2} dz$, where C is |Z| =3, by Cauchy residue theorem. 05

c) Solve $\propto^2 \frac{\partial^2 u}{\partial x^2} = \frac{\partial u}{\partial t}$, 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. 05

Q.5 a) Find the bilinear transformation which maps the points Z=0, $-i$, $2i$ into the points W= $5i$, ∞ , $\frac{-i}{3}$ respectively. 05

b) Expand $f(z) = \frac{z^2-1}{(z+2)(z+3)}$ in a Laurent's series for 2< |Z| < 3. 05

c) Evaluate $\int_0^{2\pi} \frac{d\theta}{13+12cos\theta}$, by residue theorem. 05

2016

Section B

Q.6 Solve any five:- 10

a) Find the Laplace transform of $\frac{sin4\,t}{t}$.

b) Find the Laplace transform of $\left[\frac{d}{dt}\,(t^3e^{-3t})\right]$.

c) Find the Laplace transform of $[a\,cos^2\,2bt]$.

d) Find the inverse Laplace transform of $\frac{1}{s}\left(\frac{s-a}{s+a}\right)$

e) Find the inverse Laplace transform of $\left[\frac{s}{(2s+1)^2}\right]$.

f) Find the inverse Laplace transform of $\frac{Se^{-2s}}{S^2+25}$

g) Find f(x) , if its Fourier sine transform is $e^{-a\lambda}$.

h) Find the Fourier transform of

$$f(x) = 0\,, \infty < x < a$$
$$= x\,, a \le x \le b$$
$$= 0\,, x > b$$

Q.7

a) Evaluate $\int_0^\infty \frac{e^{-t}\,sin\sqrt{3t}}{t}\,dt$. 05

b) Find the inverse Laplace transform of $\frac{1}{2s}\log\left(\frac{s^2+36}{s^2+16}\right)$ 05

c) Solve $\frac{\partial u}{\partial t} = K\,\frac{\partial^2 u}{\partial x^2}$, subject to the conditions 05

1) u= 0 , when x =0, t $\geq$ 0
2) $u = e^{-ax}$, when t =0 , x > 0 and
3) $u(x,t)$ Is bounded.

Q.8

a) Find the Laplace transform of $e^{4t}\int_0^t t\cos t\;dt$. 05

b) Find inverse Laplace transform of $\frac{s}{s^4+8s^2+16}$ by convolution theorem. 05

c) Find the Fourier sine transform of $\cos hx - \sin hx$ 05

Q.9

a) Find the Laplace transform of periodic function. $f(t) = \left(\frac{\pi+t}{2}\right)^2, 0 < t < 2\pi\ and\ f(t) = f(t+2\pi)$. 05

b) 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. 05

c) Solve the integral equation $\int_0^\infty f(x)\sin px\,dx = 1-p\,, 0 \le p \ge 1$ 05

0, P>1

Q.10

a) Express the following function in terms of Heaviside unit step function and hence find their Laplace transform. 05

$f(t) = (t-a)^4, t > a$
$= 0, 0 < t < a$

b) Solve $\frac{dx}{dt} + y = 0\,, \frac{dy}{dt} - x = 0\,, x(0) = 1\,, y(0) = 0$ 05

c) Find the Fourier transform of $f(x)$, where 05

$f(x) = \cos x\ , if\ 0 < x < 1$
$= 0$, Otherwise.

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-35
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C) Examination Oct/Nov 2016
Signals & Systems
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Question number 1 and 6 are compulsory
ii) Attempt any two questions from each section from question 2 to 5 & 7 to 10.
iii) Assume suitable data as required.

Section A

Q.1 Attempt any five from the following. 10

a) Enlist types of system
b) State any two properties of convolution integral
c) Give condition to identify periodic signal
d) Define energy signal & power signal
e) Compare causal & non-causal system
f) Represent graphically standard test signals
g) State properties of convolution sum

Q.2 a) If a signal x(t) is given by, 08

$x(n) = \{2,1,-2,3,0,1\}$
$\uparrow$

Sketch i) $x(-n).u(n)$
ii) $x(-3+n).d(n-1)$
iii) $3x(2-n)$
iv) $x^2(n).r(n)$

b) Determine whether the following systems are linear or not 07

i) $y(n) = \cos(x(n))$
ii) $y(n) = n.x.(n)$

Q.3 a) Compute linear convolution by mathematical method for- 08

$x(n) = \frac{1}{3}n \; ; 0 \le n \le 6$
$= 0 \quad$; otherwise
$h(n) = 1; -2 \le n \le 2$
$= 0$; otherwise

b) What is signal? Classify it in detail. 07

Q.4 a) Explain shift variant & shift invariant system with examples. 07

b) Find the system output $y(n)$ of any system to the i/p $x(n) = a^n.u(n)$ 08
Where impulse response of LTI system is - $h(n) = u(n) - u(n-N)$

2016

Q.5 Write short note on – (any three) 15

a) Sampling theorm & it's appin
b) Classification of system
c) Operation of signal
d) Standard test signals

Section – B

Q.6 Attempt any five 10

a) Write merits & demerits of FT
b) Prove that total area under curve of ESD of energy s/g is equal to signal energy.
c) State properties of cross correlation
d) State & explain nyquist rate
e) Prove linearity property of FT
f) Option FT of unit step signal
g) What is auto correlation & cross correlation

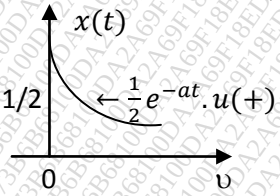
Q.7 a) Obtain Fourier transform of cosine wave having frequency (fo) & peak amplitude of unity. Also plot its spectrum. 07

b) Draw correlogram for sequence 08
i) $x(n) = u(n)$
ii) $y(n) = u(n-4)$

Q.8 a) Prove that, when a power signal $x(t)$is applied to an LTI system, the PSD of its output is equal to the PSD of its input multiplied by squared amplitude response of the system. 08

b) Define Fourier transform. Explain its properties. 07

Q.9 a) Find ESD for given s/g. $x(t)$ as 07



b) Find cross correlation of 08
$x(n) = \{1,2,1,2\}$
$y(n) = \{2,1,1,2\}$
↑

Q.10 Write short note on – any three 15

a) Energy & power signals
b) LTI response of exponential signal
c) Sampling of Band pass signal
d) Applications of ESD & PSD

2016

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-65
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C) Examination Oct/Nov 2016
Digital Logic Design
(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 in each section.
iii) Figures to the right indicate full marks.
iv) Assume suitable data wherever necessary.

Section A

Q.1 Solve any five from the following. 10

i. Define and explain 'worst case input voltage 'of TTL gate.
ii. Draw the logic diagram of Gray to binary converter.
iii. Comment on propagation delay for logic family.
iv. What is K-map?
v. Compare ECL and CMOS families.
vi. Give applications of Gray code.
vii. Explain the need of BCD to 7-segment decoder
viii. What is a tri-state TTL?

Q.2 a) Design a 32:1 multiplexer using 4:1 multiplexers. 08

b) Minimize the following logical function using K-map and realize the same : 07
$F = \Sigma m (0,2,4,6,10,11,12, 14,15)$.

Q.3 a) Explain the operation of a two input CMOS NAND gate. 08

b) Explain in detail the TTL family . 07

Q.4 a) The following seven bit even parity Hamming characters have been received as : 09
i) 0101110
ii) 1010011
iii) 1001010
Find the correct binary word from them.

b) Define the following terms: 06
i) Noise margin
ii) Fan- out
iii) Fan – in

Q.5 Write short notes on the following :(any three) 15

i) Full sub tractor circuit
ii) Race around condition
iii) Digital comparator
iv) ALU
v) Programmable Logic Arrays.

Section – B

Q.6 Solve any five from the following : 10

i) What is ADC? Give its types.
ii) Describe the truth table of an S-R flip-flop
iii) Explain the use of carry and borrow in case of a counter.
iv) Distinguish between synchronous and asynchronous counter.
v) State the applications of flip- flops.
vi) How does T flip-flop operate?
vii) Compare EPROM and EEPROM.
viii) Mention the details of Moore machines.

Q.7 a) Design a Mod -3 ripple counter. 08

b) Design a 7:128 decoder using 4:16 decoders. 07

Q.8 a) Using the conversion method , carry out the following conversions : 08

i) JK to D
ii) JK to SR

b) Draw and explain successive approximation A/D converter. What are its advantages? 07

Q.9 a) Explain in detail the memory classification used in digital electronics. 06

b) Compare ROM with RAM. 05

c) Comment on NVRAM. 04

Q.10 Write short notes on the following : (any three) 15

i) Flip- flop applications.
ii) Digital to analog converter.
iii) Comparison between semiconductor memory and magnetic memory.
iv) 5-bit comparator.
v) State reduction and state assignment.

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-95
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C) Examination Oct/Nov 2016
Electronics Devices & Circuits - II
(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 questions from remaining questions in each section.
iii) Figures to the eight indicate full marks.

SECTION A

Q.1 Solve any five 10

i. Draw construction and symbol of schottky Diode?
ii. How cross over distortion are eliminated?
iii. Draw response of pulse amplifier in frequency domain.
iv. What are various parameters of op – amp.
v. What is Gunn Effect?
vi. Derive efficiency of class-A amplifier.
vii. What is negative resistance region?
viii. Draw pin diagram of IC 741.

Q.2 a) Explain construction, working and characteristics of Tunnel diode in detail. 08
b) Explain Read diode in detail. 07

Q.3 a) Show that maximum efficiency of class B amplifier is 78.6%. 08
b) Describe heat sink design on detail. 07

Q.4 a) Derive efficiency of dual input balance output. 08
b) Explain in brief block diagram of operational amplifier. 07

Q.5 a) Describe collector dissipation curve in detail. 08
b) What in operational amplifier? Describe in detail. 07

SECTION B

Q.6	Solve any five		10
	i.	Draw series negative clipper with waveforms.	
	ii.	Compare bistable and monostable multivibrator.	
	iii.	Define integrator with its output equation.	
	iv.	What is meant by current sweep generator	
	v.	Draw circuit and waveforms of combination clippers.	
	vi.	What in meant by 50% duty cycle?	
	vii.	Explain self-bias binary.	
	viii.	What are various blocking oscillators	
Q.7	a)	Derive equation for differentiator and explain with neat diagram.	08
	b)	What is meant by clamper? Explain biased clampers.	07
Q.8	a)	What is as table multivibrator explain with waveforms.	08
	b)	What in meant by fixed biased binary? Explain.	07
Q.9	a)	Explain operation of Miller sweep generator.	08
	b)	Explain monostable blocking oscillator with emitter timing.	07
Q.10	Short notes (Any three)		15
	a)	Schmitt trigger	
	b)	Commutating Capacitor	
	c)	Bootstrap sweep generators	
	d)	Biasing clippers.	

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-162
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C) Examination Oct/Nov 2016
Electrical Machines & Instrumentation
(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Attempt any three from each section.
ii) Q. No 1 & Q. No.6 are compulsory.
iii) Attempt any two questions from remaining four questions from each section.

Section A

Q.1 Solve any five from following. 10

i) The values of armature & filed resistances for DC Series Generators & for DC Shunt Motors are
a) Low & low, b) Low & high c) high & low d) high & high
ii) DC Series Motor never to be started on NO LOAD Conditions. Why?
iii) Draw circuit for DC Series motor with proper notations.
iv) Why the rotor copper bars are not parallel to the rotor shaft?
v) Draw power stages for DC Shunt Motor.
vi) Write two applications of fractional HP Motors?
vii) What are constrains for Permanent magnet Stepper motors?
viii) Draw three characteristics for DC Series Generator.

Q.2 a) Explain the constriction of DC machine with neat sketch. 08
b) Explain different methods of speed control for DC Shunt motor. 07

Q.3 a) Explain various speed control methods of 3-phase induction motor. 08
b) Explain the construction of 3-phase induction motors. 07

Q.4 a) What are different starters used for poly phase induction motors? Explain DOL Starter. 07
b) Explain the working principle of Synchronous motor. Why synchronous motor is not self starting? 08

Q.5 a) Explain the construction and types of servo motors. 08
b) Explain the construction and working of PM Stepper motor. 07

Section B

Q.6 Solve any five from following. 10

a) State four selection criteria's for transducers.
b) What is strain gauge?
c) What is thermocouple?
d) What is Smoke detector?
e) Classification of Displays?
f) Vibration measurement?
g) Different photo sensors.
h) Thickness measurement.

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Q.7	a)	Explain interfacing techniques of transducers with microprocessor.	08
	b)	With neat circuit diagram explain strip chart recorders.	07
Q.8	a)	Explain the working of object counters.	07
	b)	What are the different types of photosensitive devices? Explain in brief.	08
Q.9	a)	With the suitable diagram explain the working of LVDT. Also give its applications.	08
	b)	What are the different types of strain gauges? Derive the relation for gauge factor.	07
Q.10	Attempt any three.		15
	a)	VAW meter.	
	b)	Alpha numeric display.	
	c)	Optical oscillograph.	
	d)	Water level meter.	

Total No. of Printed Pages:3

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 $(D^2 + 13D + 36)y = e^{-4x} + cos2x$ 05

b) Find the Karl Pearson's coefficient of skewness for the following 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 $\frac{EW}{(n^2-w^2)L}(coswt - cosnt)$ where $\eta^2 = \frac{1}{LC}$ 05

Q.3 a) Solve by method of variation of parameters. $(D^2 + 2D + 1)y = 4e^{-x}\log x$ 05

b) Apply the method of the least squares to fit a parabola $y = a + bx + cx^2$ for the data. 05

X	-1	0	0	1
Y	2	0	1	2

c) Solve $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = \sin(logx^2)$ 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 05

I. At least 2 pumps will be working

II. 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 $w^2 = b^2 - k^2$. 05

c) Solve $(2x+1)\frac{d^2y}{dx^2} - \frac{dy}{dx} + \frac{y}{2x+1} = \frac{3x+4}{2x+1}$ 05

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. 05

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 $Q = \frac{EI\pi^2}{l^2}$ 05

c) Solve by general method $(D^2 + 3D + 2)y = e^{e^x}$ 05

Section – B

Q.6 Solve any five 10

a) Find the first approximate value of the root $(ie.\ x_1)$ by Newton – Raphson method for $\log_e x - x + 3 = 0$.

b) Find the values of x, y, z in the first iteration by Gauss Seidel Method for

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

$x + 5y + z = 7$

$2x + y + 6z = 9$

c) Find f(1) for data

X	0	2	3
F(x)	-4	2	14

d) Find grad ∅ at (1,1,-1) if $\emptyset = e^{2x-y+z}$.

e) Prove that $\bar{F} = (y^2 cosx + z^3)i + (2y\ sinx - 4)j + (3xz^2 + 2)K$ is conservation field.

f) If $\bar{A}(t) = ti - t^2j + (t-1)K$

$\bar{B}(t) = 2t^2i + 6tk$

Evaluate $\int_0^2 \bar{A}.\bar{B}\ dt$.

g) If $\bar{r} = xi + yj + zk$ then find $\nabla.\bar{r}$.

h) 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). 05

b) Find the directional derivation of $\emptyset = xy^2 + yz^3$ at the point (2,-1, 1) in the direction of the normal to the surface $xlogz - y^2 = -4$ at (-1,2,1). 05

c) If $\bar{F} = (5xy - 6x^2)i + (2y - 4x)j$, evaluate $\int_c \bar{F}.d\bar{r}$ along the curve C in $x - y$ plane, $y = x^3$ from the point (1, 1) to (2, 8). 05

Q.8 a) Solve by Gauss Seidel method 05

$28x + 4y - z = 32$

$x + 3y + 10z = 24$

$2x + 17y + 4z = 35$

2016

b) Verify Green's theorem for $\bar{F} = x^2 i + xyj$ 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 $\int_c \bar{F}.d\bar{s}$ where 05
$\bar{F} = yi + xj + z^2 k$ over the cylindrical region bounded $by\ x^2 + y^2 = 9, z = 0$ and $z = 2$.

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

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-310
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EC/ECT/IEC/E&C) Examination Oct/Nov 2016
Data Structure
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Que.No.1 and Q.No.6 are compulsory.
ii) Attempt any two questions from Q.2 to Q.5 and any two questions from Q.7 to Q.10.

Section A

Q.1 Solve any five. 10

i) What is data structure? Explain its types.
ii) Define pointers.
iii) How structure is different from array.
iv) Explain prefix, infix and post fix notations?
v) What are the primitive operations performed on stack.
vi) Represent a node in doubly linked list with diagram.
vii) Represent the following polynomial using linked list with a diagram.
$7x^2 + 10x - 8 = 0$
viii) Explain malloc ( ) function.

Q.2 a) Discuss strong classes in detail. 07
b) Write a program to demonstrate array as ADT. 08

Q.3 a) Write an algorithm to evaluate postfix expression. 07
b) Write a program for representation of a queue as an array. 08

Q.4 a) Explain various operations performed on single linked list. 07
b) Compare singly, doubly & circular linked list. 08

Q.5 Write a short note on any three. 15

i) Circular queue
ii) Circular linked list
iii) Functions
iv) Definition & concept of linked list

Section – B

Q.6 Attempt any five. 10

i) What is directed graph?
ii) What is weighted graph?
iii) Explain any two terminologies in graph.
iv) Define height & level of a tree.
v) What is strictly binary tree?
vi) What is left sub-tree & right sub-tree?
vii) Differentiate between linear search & binary search.
viii) Explain sequential searching.

Q.7 a) Explain graph representation using adjacency matrix and adjacency list. 07
b) Explain DFS method of graph traversal. 08

Q.8 a) Write a C program to build a binary tree. 08
b) Explain tree traversal methods. 07

Q.9 a) Explain shell sort with a program. 08
b) Explain selection sort with a program. 07

Q.10 Write a short note on any three. 15

i) Minimum cost spanning tree
ii) Tree application for expression evaluation
iii) Binary search tree
iv) Quick sort

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-212
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EC/ECT/IEC/E&C) Examination Oct/Nov 2016
Electronics Devices & Circuits-I
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Solve three question from each section
ii) Q.1 and Q.6 are compulsory.

Section A

Q.1 Solve any five 10
a) Draw symbol and give applications of varactor diode.
b) Enlist different types of filters.
c) Define output short h-parameters.
d) Why cascading is required.
e) Give advantages of Darlington pair connection.
f) Define pinch-off voltage.
g) What is CMOS?
h) Compare JFET with BJT on any 4 points?

Q.2 a) Enlist types of filters and explain any one in details. 08

b) Explain two stages RC coupled Amplifier. 07

Q.3 a) Draw hybrid equivalent circuit of cc transistor and derive various hybrid parameters. 08

b) Explain n- Channel JFET with constructions, symbols, working and characteristics'. 07

Q.4 a) Explain application of MOSFET as amplifier and switch. 08

b) Draw and explain CMOS inverter. 07

Q.5 Write short note on any three 15
a) Solar cells
b) Effects of coupling & by pass capacitors
c) FET biasing
d) h-parameters

Section-B

Q.6 Solve any five 10

a) Define cut-off frequencies.
b) Draw OPTO coupler circuit.
c) Define bode plot.
d) Give two differences between Amplifier and oscillator.
e) Define Barkhausen criteria.
f) Draw RC phase shift oscillator.
g) What is gain band width product?
h) What is mean by hybrid π model?

Q.7 a) Draw and explain list frequency equivalent circuit for BJT Amplifier. 08

b) Explain Hartley oscillator in details. 07

Q.8 a) Draw and explain Heterojunction bipolar transistor. 07

b) Compare different types of negative feedback methods on various parameters. 08

Q.9 a) Draw and explain UJT relaxation oscillator. 08

b) Draw and explain small signal High frequency hybrid – πmodel of Transistor. 07

Q.10 Write short notes on any three 15

a) Video Amplifier
b) BJT modeling
c) Frequency stability of an oscillator
d) Emitter follower at high frequency

Total No. of Printed Pages:3

SUBJECT CODE NO:- K-243
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EC/ECT/IEC/E&C) Examination Oct/Nov 2016
Network Analysis
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Question No.1 and Question No.6 are compulsory.
ii) Solve any two questions from the remaining in each section A & B respectively.
iii) Figures to the right indicate full marks.

Section A

Q.1 Solve any five 10

a) What are different types of sources?
b) Define Tie set & Cut set matrix.
c) What is relation between Decibel & Neper?
d) Define Link & Twigs.
e) What are different types of filters?
f) Define Thevenin's Theorem.

Q.2 a) State & explain superposition Theorem. 07

b) Obtain Thevenin's equivalent network for terminals A&B in figure 1. 08

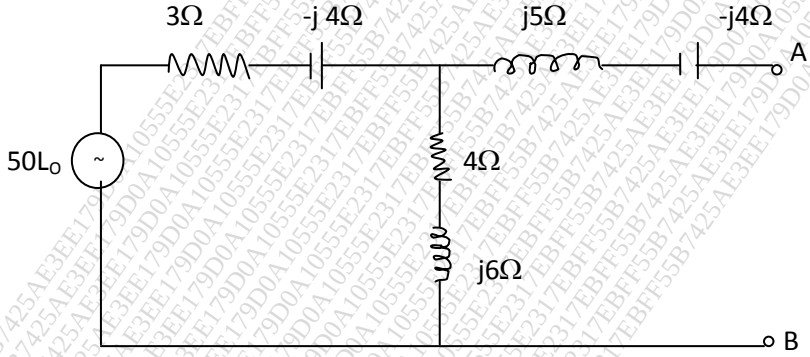

Fig. 1

Q.3 a) State and explain maximum power Transfer Theorem. 07

b) For the circuit shown in Fig.2 draw the oriented graph & write the a) Incidence matrix b) tieset matrix c) f- cutest matrix. 08

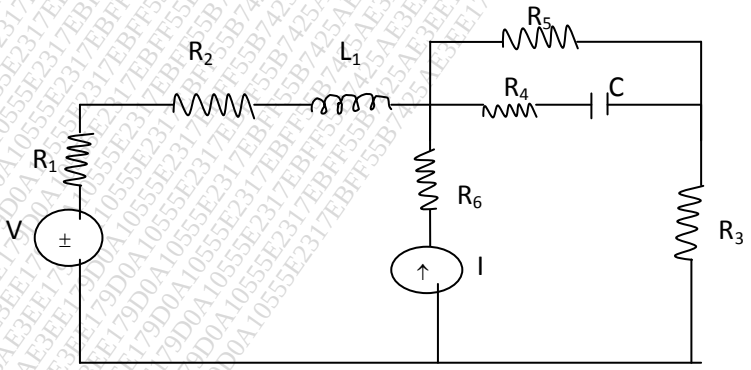

Fig.2

2016

Q.4 a) What is constant K filter? Explain demerits of m-derived filter. 07

b) Design m-derived T section high pass filter with cut-off frequency of 2KHz. Design impedance of 700 Ω & m=0.6. 08

Q.5 Write a short note on: (any three) 15

a) Norton's Theorem
b) Star-delta transformation
c) Principle of duality
d) Parameters of filters

Section B

Q.6 Solve any five 10

a) What are different two part parameters?
b) Define Q-factor.
c) Write significance of resonance.
d) Write Transmission parameter.
e) What is Bandwidth?
f) What are properties of Laplace Transform?

Q.7 a) Give h-parameter equations; define all the h-parameters with relevant condition. 07

b) Determine Y- parameters for the network shown in fig.3. Determine whether the network is symmetrical & reciprocal. 08

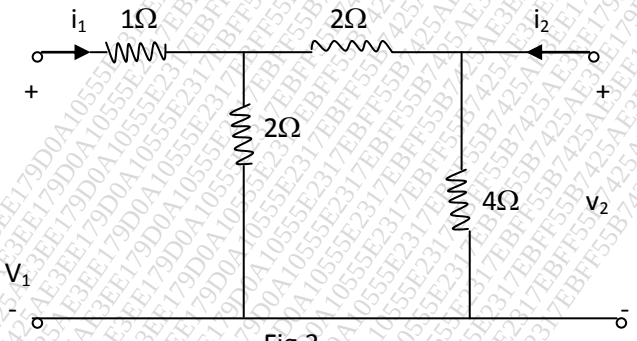

Fig.3

Q.8 a) What is parallel resonance? Derive the expression of anti-resonant frequency. 07

b) Show that the resonant frequency of series RLC circuits geometric mean of the lower & upper half power frequencies. 08

Q.9 a) A series RL circuit with R=50Ω & L=20H has a constant voltage V=50V applied at t=0 as shown in fig.4. Determine the current i, voltage across resistor & voltage across inductor. 07

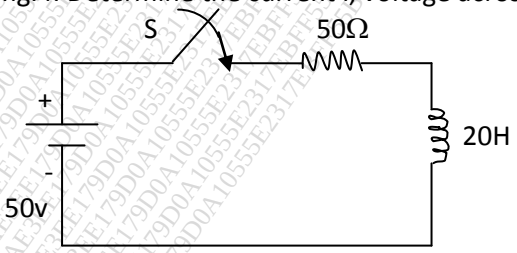

Fig.4

2016

b) Calculate the value of impendence that will make the circuit shown in fig.5 resonant. 08

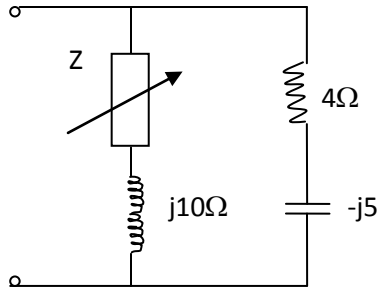

Fig.5

Q.10 Solve any three 15

a) Transformed RLC circuit for DC excitation.
b) Z-parameters.
c) Variation of current & voltage with frequency in RLC circuit.
d) Inter connection of two port network.

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-276
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EC/ECT/IEC/E&C) Examination Oct/Nov 2016
Communication Engineering
(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 compulsary.
ii)Solve any two questions from Q. No. 2 to Q.No.5
iii)Solve any two Questions from Q.No.7 to Q.No.10
iv)Assume suitable data, if necessary.

Section A

Q.1 Solve any Five: 10

a) Define Am, Fm, with necessary wave form.
b) Define noise and state the types.
c) Explain need of AGC in Am CKT.
d) Define modulation index of Am and Fm respectively with necessary formula.
e) Define flywheels effect of tank CKT.
f) Define sensitivity, selectivity of radio receiver.
g) Explain in short about single side band technique?(SSB).

Q.2 a) Derive expression for total radiated power(P_t) interns of modulation index and total radiated current I_t of Am Wave. 08

b) Explain Armstrong method of Fm geneation with suitable example. 07

Q.3 a) Compare Am, Fm, and Pm with respect to different parameters and techniques. 08

b) A suitable carrier wave of carrier voltage Vc=3 sin $(2\pi\times 600\times 10^3)$t is amplitue modulated by an audio wave of Vm=0.5 sin3$[2\pi\times 600]$t +0.2sin6$[2\pi\times 600]$t. 07

Determine the upper and lower side bands and sketch the complete spetrum of the modulated wave. estimate the total power int the side bands of AM wave.

Q.4 a) Explain simple and practical diode detector circuit and also explain how AGC o/p is derived using practical diode detector. 08

b) The antenna current of Am transmiter is 9.2 AMP if only carrier is sent, and its increases to 9.9AMP, If the carrier is modulated by single sinusoidal wave form. find the modulation index in percentage. if antenna current is to be calculated then state the procedure for it. 07

Q.5 Write a short note on following.(Any Three). 15

i) Pre-emphasis and de-emphasis Network.
ii) Delayed AGC circuit.
iii) Filter method of SSB.
iv) Image frequency and its rejection.
v) Tuned Radio frequency Receiver (TRF).

Section – B

Q.6 Solve any Five questions from following. 10

a) Define pulse modulation and explain the pulse amplitude modulation with waveform.
b) Define multiplexing and state its types.
c) What is the function of microphone?
d) What is the function of mixer in receiver?
e) State different types of FM detector.
f) Explain the process of quantization.
g) State sampling theorem.

Q.7 a) Draw and explain the block diagram of Delta modulation. State its problems. 08
b) Draw and explain the block diagram of FM receiver. 07

Q.8 a) Draw and explain the figure of dynamic type loud speaker. 08
b) Draw an explain crystal type microphone. 07

Q.9 a) Explain about optical recording and reproduction with suitable example. 08
b) Draw the block diagram of public address system explain the function of each block. 07

Q.10 Write a short note on following (Any three). 15

i) Frequency division multiplexing (FDM).
ii) Principles of T.V. signal generation.
iii) Pulse code modulation technique.
iv) Carbon microphone.
v) Horn type loud speaker.