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:4

SUBJECT CODE NO:- K-37
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE) Examination Oct/Nov 2016
Network Analysis
(Revised)

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

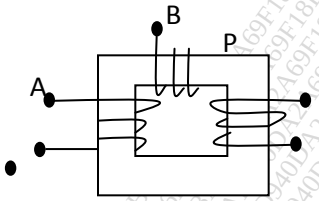
Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 is compulsory and solve two questions from remaining questions from each Section A and B.
ii) Assume suitable data if necessary.

Section A

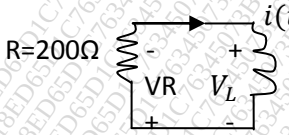
Q.1 Solve any five questions. 10

(a) Give the principles of duality
(b) Explain the concept of dependent source? Which are its various types?
(c) State and explain superposition theorem
(d) By dot convention make the dotted ends for the arrangement of coils in figure 1.



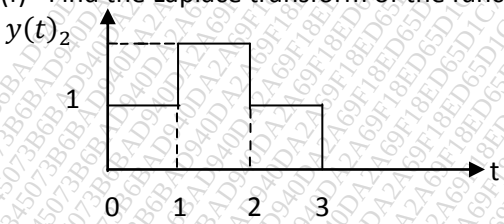
(Figure 1)

(e) In how many seconds after $t = 0$ has the current $i(t)$become one half of its initial value in the given circuit of figure 2



(Figure 2)

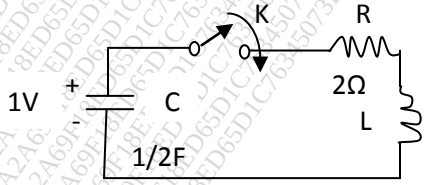
(f) Find the Laplace transform of the function in figure 3



(Figure 3)

(g) Draw the equipment circuit of single inductor in Laplace domain.
(h) Define and explain. Characteristics of unit step and ramp function.

Q.2 (a) For series RLC circuit the capacitor is initially charged to IV. Find the current $i(t)$ when the switch k is closed at $t = 0$ use Laplace transform (figure 4) 05



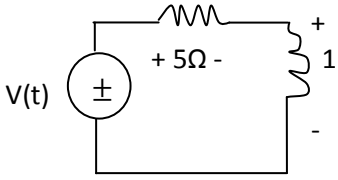
(Figure 4)

05

(b) The network shown in the figure is exited by $v(t) = \varrho\mu(t) + k\delta(t)v$ the intial current through induction is zero. Determine the value of k so that the expression of the current $i(t)$ does not have

2016

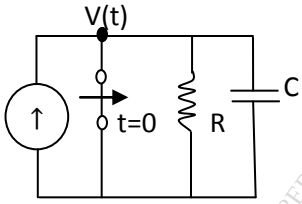
any translient term (figures 5)



(Figure 5)

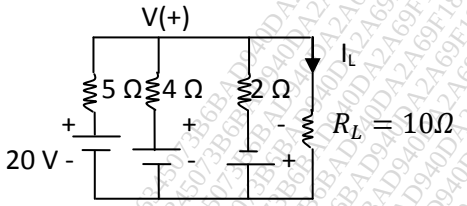
05

(c) Switch is opened at t=o solve for $v(t)$, $\frac{dv(t)}{dt}$ and $\frac{d^2v(t)}{v(t)dt^2}$ at $t = 0^t$ (figure 6)



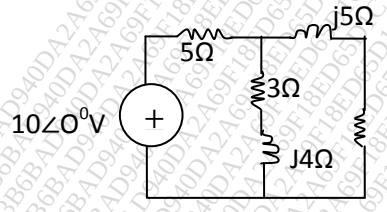
(Figure 6)

Q.3 (a) Find the current I_L using Milman's theorem 05



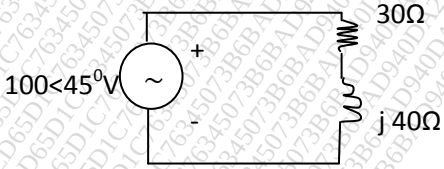
(Figure 7)

(b) Find the current through branch a-b of the network shown in the figure using Thevenin theorem (figure8) 05



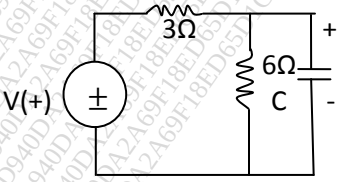
(Figure 8)

(c) Calculate the change in current in the network shown in figure by using compensation theorem when the reactance has changed to j35 Ω (figure 9) 05



(Figure 9)

Q.4 (a) Let $vc\ (0) = 2v$ with the polarities shown in the figure. write suitable differential equation and using Laplace transform find $vc(+)$ (figure 10) 05

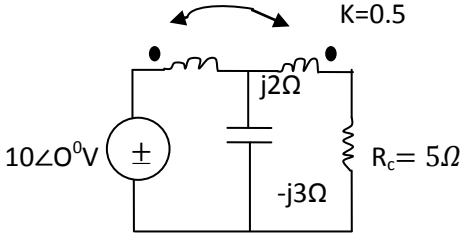


VC (Figure 10)

(b) Explain the graphical method to draw dual network. 05

(c) Write a short note on dot connection for coupled circuit. 05

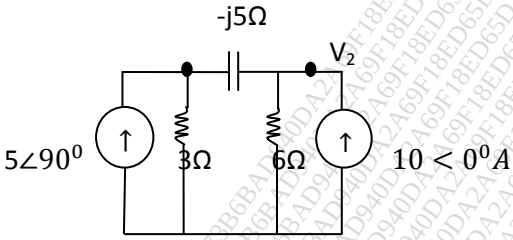
Q.5 (a) Find drop across R_L in the network as shown in (figure 11) 05



(Figure 11)

(b) Write short note on super node. Concept. 05

(c) The nodal Analysis to find V_2 in the circuit shown in figure 12. 05



(Figure 12)

Section – B

Q.6 Solve any five questions. 10

(a) What is a two port network?

(b) Define energy and power when a network is excited by purely sinusoidal voltage.

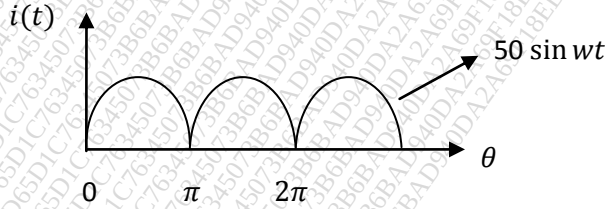
(c) Define effective or rms value. Explain its practical significance.

(d) State the Dirichlet's conditions.

(e) Write the Trigonometric form of the Fourier series.

(f) Write the physical significance of reactive power.

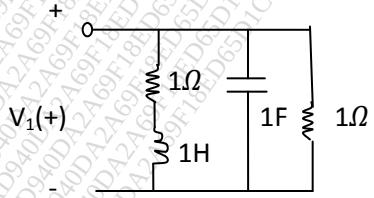
(g) The current of the following wave form is passed through 5 Ω resistance find the power consumed (figure 13)



(Figure 13)

(h) Define network function. State its significance.

Q.7 (a) Find the driving point admittance $y(s)$ for the network shown inn figure 14 and plot pole new diagram. 05



(Figure 14)

(b) Explain the necessary conditions for transfer functions. 05

(c) A network function is given as below. 05

$Z(s) = \frac{s}{s^2+2s+2}$ find value of $Z(s)$ at $s = j^2$.

Q.8 (a) Find the Fourier series for a square wave defined as $f(t) = +A \ \ 0 < t < {}^{T}/_{2}$

$= -A \ \frac{+T}{2} < t < T$ 05

(b) Derive the complete form representation of Fourier series. 05

(c) Explain in brief concept of even and odd function. 05

Q.9 (a) What is insertion loss? Explain. 05

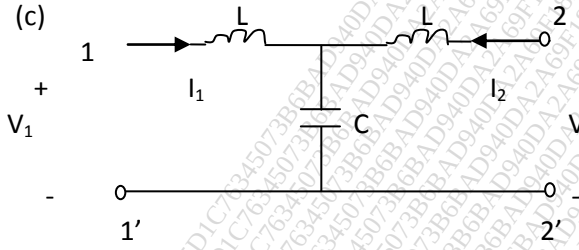
(b) Calculate the average value, rms value and form factor of the output of a half wave rectifier when input to rectifier is purely sinusoidal alternating current. 05

(c) Derive the condition of reciprocity for z parameters. 05

Q.10 (a) State the different types of inter connection of two ports. (explain any one) 05

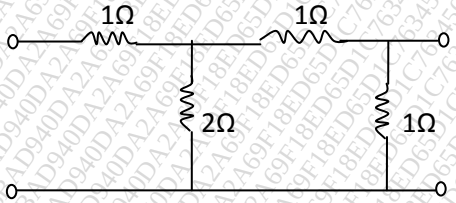
(b) Find Z parameters of the network as shown in figure 15 05

(c)



(Figure 15)

(d) Obtain transmission parameters for the network shown in circuit of figure 16. 05



(Figure 16)

2016

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-67
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE) Examination Oct/Nov 2016
Electrical Power Transmission & Dist.
(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) Answer any two question from Q.No2 to 5 from section A.
iii) Answer any two question from Q.No 7 to 10 from section B

Section- A

Q.1 Attempt any (five)

a) What is tariff and types of tariff 02
b) Describe the desirable characteristics of a tariff. 02
c) List out different types of Distribution power systems. 02
d) Classification based on length & voltage of power transmission line. 02
e) What is concept of T & π type method calculation? 02
f) What is interconnected system of distribution. 02
g) What is corona loss 02
h) Define string efficiency. 02

Q.2 a) State major equipments in sub-station with its functions. 05

b) What is transposition of conductor & why it is needed. 05

c) A power station has a maximum demand of 15000 kw. The annual load is 50% and plant capacity factor is 40 % . Determine the reserve capacity of the power station. 05

Q.3 a) Explain clearly skin effect and proximity effect when referred to over head lines. 05

b) What is corona? Explain factor affecting corona. 05

c) A string of four insulator has as a self capacitance equal to 5 times pin to earth × C = 1 Ω .Find (i) the voltage distribution a/cross various units as a percentage of total voltage across the string (ii) string efficiency. 05

Q.4 a) Find an expression for flux linkage due to single current carrying conduct. 05

b) Derive expression for nominal π method. 05

c) A transmission tower on a level ground, gives min. clearance of 8 meter for its lowest conductor with sag of10meter for a stream of 300 meter. If the same tower is to be used over a scope of 1 in 15 , find the minimum ground clearance obtained for the same span , same corductor and same weather conditions. 05

Q.5 Writes short notes. 15

i) Type of distribution system.
j) Load fore casting
k) Penalty tariff and incentives.

Section – B

Q.6 Attempt any five of following

a) What are types of underground cable. 02
b) What is armouring of cable. 02
c) What are A B C D constants. 02
d) What is ACSR conductor and state its significance. 02
e) State different types of underground cable. 02
f) What is meant by Ferranti Effect. 02
g) What is dielectric stress. 02

Q.7 a) Draw neat sketch of underground cable and explain its constructional features. 05

b) Discuss various types of O/H line supports. 05

c) Derive expression of capacitance of 3 phase line with unsymmetrical spacing. 05

Q.8 a) Compare EHVAC and HVDC transmission line. 05

b) State the values of generalized circuit constant of ABCD in case of Type equation here. 05

i. T equivalent circuits.
ii. T-T equivalent circuits of medium transmission

c) A 33 kv ; 50 Hz ; 3dia. underground cable 4km long uses three single core cables. Each of the conductor has a diameter of 2.5 cm and radial thickness of in solution is 0.5 cm Determine 05

a) Capacitance of cable/ phase
b) Charging current / phase
c) Total charging KVAR .

The relative permittivity of insulation is three.

Q.9 a) Explain grading of cable and one method of locating faults. 05

b) What are desired characteristics of ideal insulators used in transmission lines? 05

c) A 3 phase 50 hz, 150kms line has a resistance ,inductance reactance and capacitive shunt admittance of 0.1 Ω , 0.5 Ω and 3×10^{-6} per km per phase If the line delivers 50 MW at 110 Kv and 0.8 power factor . Logging ,determine the sending end voltage and current .Assume a nominal π circuit for the line. 05

Q.10 Write short notes. 15

a) XLPE Underground cable
b) Effect of ice and wind loading on transmission line
c) Concept of GMR and GMD.

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-164
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE) Examination Oct/Nov 2016
Analog & Digital Circuits
(Revised)

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

Please check whether you have got the right question paper.

N.B Question number 1 & 6 are compulsory. Solve any two questions from remaining for each section.

Section A

Q.1 Solve any five from following. 10
a) Define load line.
b) Draw pin diagram of 79XX IC.
c) Define cut off mode of BJT.
d) Define avalanche breakdown.
e) Define α and β of BJT.
f) Explain slew rate of op amp.

Q.2 a) Explain any two applications of Op Amp in detail. 08
b) Explain Common collector configuration of BJT. 07

Q.3 a) Explain Op Amp IC 324 in detail. 08
b) Explain generation of sine and triangular wave using Op Amp. 07

Q.4 a) Explain instrumentation Amplifier in detail. 08
b) Explain SOP and POS form in detail. 07

Q.5 Write a short note on any three. 15
a) IC 555.
b) RC couples amplifier.
c) Sequence generator.
d) FET Parameters.

Section B

Q.6 Solve any five from following. 10
a) $(101)_{10} = (?)_{02}$
b) Find 2's compliment of $(11001100111)_2$.
c) Convert following number from binary to Ex-3 code. (1110110).
d) Write BCD representation of Decimal Number 1 to 10.
e) Explain Ex-OR & Ex-NOR Gate.
f) $(134)_{08} = (?)_{16}$.

Q.7 a) Construct AND, OR & NOT logic using NOR gate. 08
b) Explain the working of ADC. 07

2016

Q.8 Simplify following equation using K Map. 15

a) $Y = BCD + A\overline{C}D + \overline{A}B\overline{C} + \overline{A}BD$

b) $Y = ABC + \overline{A}B\overline{C}$

c) $Y = ABCD + \overline{A}\,\overline{B}C\overline{D} + A\overline{B}\,\overline{C}D$

Q.9 a) Explain Twisted Ring Counter in detail. 08

b) Explain SR and JK Flip flop. 07

Q.10 Write a short note on <u>any three</u>. 15

a) Multiplexer.

b) Memory devices.

c) Buffer register.

d) De-morgon's theorem.

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

SUBJECT CODE NO:- K-312

FACULTY OF ENGINEERING AND TECHNOLOGY

S.E.(EEE) Examination Oct/Nov 2016

Electronics Devices and Circuit

(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 any two questions from each section from the remaining questions.
iii) Assume suitable data, if necessary.

Section A

Q.1 Solve any five: 10

a) A common base connected transistor has $I_B = 20\mu A$ and $I_E = 2mA$. Compute the value of α and I_c.
b) What is PIV of a diode?
c) What is DC load line of a transistor?
d) Explain in brief the operation of NPN transistor.
e) Draw self-biasing circuit for FET.
f) What is voltage tripler?
g) Derive average load voltage for half wave rectifier.
h) Draw the constructional detail of Depletion MOSFET.

Q.2 a) Draw and explain Bridge rectifier circuit using capacitive filter. Draw input and output waveforms. 08

b) If the required de voltage across load is 12 volts. And diode drop is 1 volt. Calculate ac input voltage required for full wave centre-tap rectifier and transformation ratio is 2:1:1 as shown in Fig a. 07

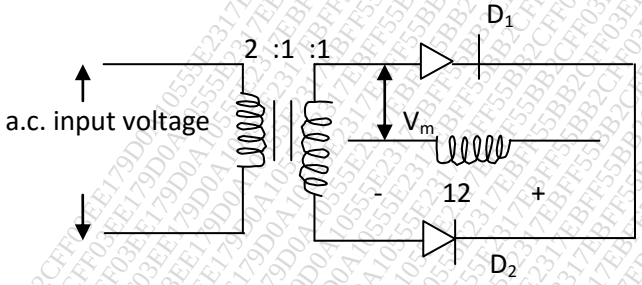


Fig. a.

Q.3 a) For the circuit shown in Fig. b. Find I_E and V_c. 08

Given that: $\beta = 100, Vce = 12V, V_{EE} = -10V$

$R_E = 4.7\ k\Omega, R_c = 2.2K\Omega$ and $V_{BE} = 0.6V$

I_E =?

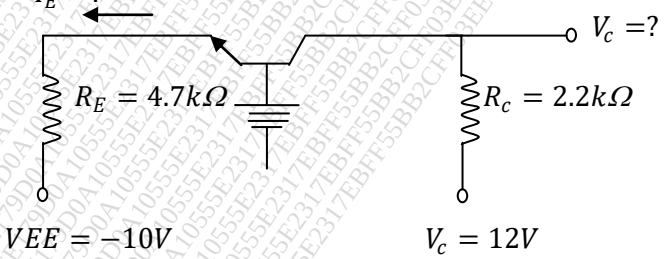


Fig. b.

b) Explain common Emitter configuration Input and output characteristic of NPN transistor. 07

Q.4 a) Calculate stability factor for collector to base bias method for BJT without emitter resistor. 08

b) For the CE circuit shown in Fig. C. Draw the DC load line and Mark Q-point on it. 07

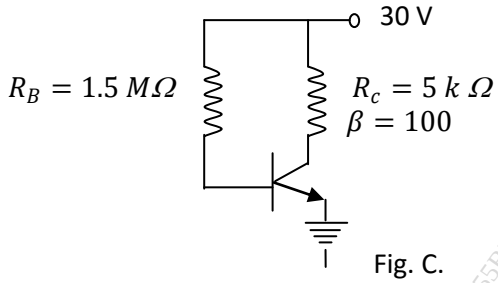


Fig. C.

Q.5 Write note on:- 15

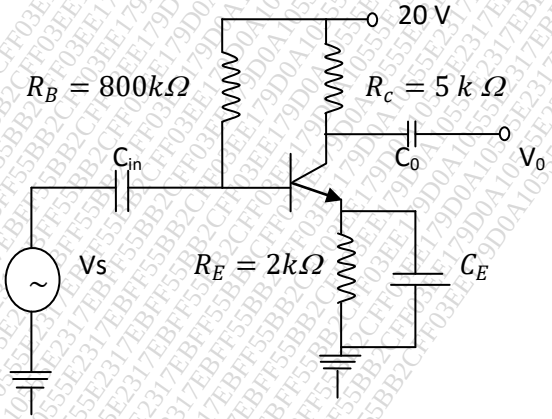
a) Transistor as a switch
b) Early effect in transistor
c) Voltage Multiplier

Section – B

Q.6 Solve any five from the following. 10

a) What is drift in amplifier?
b) What is positive feedback? State its one application.
c) What is Barkhavsen criteria?
d) Draw the Colpitts Oscillator circuit?
e) What is the effect of coupling capacitor on gain?
f) What are h-parameters? Explain.
g) Explain cascade amplifier.
h) Draw class AB power amplifier circuit.

Q.7 a) Consider a single stage CE amplifier as shown in Fig. d. 08



Given hie=1.1 k Ω, hfe=100. Find input impedance, Output impedance, current gain and voltage gain.

b) Explain Direct-coupled two stage amplifier in detail. 07

Q.8 a) What is the effect of cascading of amplifier stages on gain and bandwidth? Explain with mathematical approach. 08

b) When voltage feedback is applied to an amplifier of voltage gain 100, the overall stage gain fall to 50. Calculate the fraction of the output voltage feedback. If this fraction is maintained, calculate the value of the amplifier gain required if the overall stage gain is to be 75. 07

Q.9 a) Explain the operating of colpitts oscillator. Derive the relation for frequency of oscillation. 08

b) What are the types of power amplifiers? Explain class-A amplifier in detail. 07

Q.10 Write note on. 15

a) Frequency response of multistage amplifier.

b) Crystal Oscillator

c) Tuned amplifier

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-316
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE) Examination Oct/Nov 2016
Electrical Engineering Materials
(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 sections.

Section A

Q.1 Solve any five. 10
a) State the working principle of PV cells.
b) State the properties of good solid insulating material.
c) Define 'Ionization coefficient'.
d) Classify the magnetic materials.
e) State the applications of SF6 gas.
f) State the factors affecting breakdown voltage.

Q.2 a) What is dielectric loss? Explain toss tangent and its significance. 08
b) Explain the construction, working and applications of photo-emissive cells. 07

Q.3 a) What is impregnation? Explain the impregnation process for paper and cotton? 08
b) Explain the properties and applications of transformers oil. 07

Q.4 a) Give the classification of magnetic materials in detail with properties and applications of each class. 08
b) What is magnetism? Differentiate in between ferromagnetism and ferrimagnetism. 07

Q.5 Writes notes on. (any three) 15
a) Asbestos and varnish
b) Soft and hard magnetic materials
c) Piezoelectricity and pyroelectricity
d) Materials used for power transformers

Section B

Q.6 Solve any five. 10
a) What is thermal bimetal?
b) State the applications conductors?
c) State the applications of Nano-tubes?
d) What is super conductivity?
e) What is 'Type test' carried out on capacitor?
f) What is soldering material?

Q.7	a)	Explain BN Nano-tubes in detail?	07
	b)	What are carbons Nano-tubes? Discuss their electrical, mechanical and vibrational properties.	08
Q.8	a)	Explain the measurement of partial discharge –IS 13585-1994.	07
	b)	How to measure the KVAR capacity of power capacitor as per IS 2834 of 1986.	08
Q.9	a)	Explain the application and properties of silver and its alloys.	07
	b)	What is thermocouple? Explain its features and applications.	08

Q.10 Writes notes on. (any three) 15

a) Thermal bimetal
b) Applications of Nano-materials
c) Tungsten and Magnin
d) Flux density measurement by Guass meter

SUBJECT CODE NO:- K-214
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EEP/EE/EEE) Examination Oct/Nov 2016
Transformers & DC 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) Solve any two questions from Q.2 to Q.5.
iii) Solve any two questions from Q.7 to Q.10.
iv) Assume suitable data wherever necessary.

Section- A

Q.1 Attempt the following (any five) 10

1. State the working principle of transformer.
2. Why core of transformer is laminated?
3. What are the losses in transformer? How do they vary with load?
4. The maximum flux density in the core of 250/3000 volts, 50Hz single phase transformer is 1.2 tesla if the emf per turn is 8 volts determine primary and secondary turns.
5. In a 25KVA, 2000/200v, single phase transformer the iron and full load copper losses are 350 watt and 400 watt respectively. Calculate efficiency at full load 0.8 lagging power factor.
6. Why it is necessary to connect two transformers in parallel?
7. State the applications of stepper motor.
8. Define regulation of transformer? What should be the Ideal value of regulation?

Q.2 a) Derive the emf equation of single phase transformer. 05

b) Explain the working of transformer with phasor diagram on load. 05

c) A 230/460 volt Transformer has primary resistance of 0.2 Ω and reactance of 0.5Ω and corresponding values for secondary are 0.75 Ω and 1.8Ω respectively. Find the secondary terminal voltage when supplying 10Amp at 0.8 Pf lagging. 05

Q.3 a) Explain with diagram open circuit and short circuit test performed on single phase transformer. 05

b) Derive the condition for maximum efficiency of transformer. 05

c) For 20 KVA $\frac{2200}{220}$volt, 50Hz transformer. The O.C and S.C test results are as follows 05
O.C test :220v ,4.2A, 148 watt (l.v.side)
S.C test: 86v, 10.5 A 360watt (h.v.side). Determine the regulation at 0.8pf lagging and at full load.

Q.4 a) Explain with diagram direct load test performed on three phase transformer. 05

b) Compare three phase transformer with bank of three single phase transformer. 05

c) What are different three phase transformer connections? Give application of each. 05

Q.5 Explain the following (any three) 15

a) Auto transformer
b) Scott connection

2016

c) Three winding transformer
d) PMDC motor
e) D.C servo motor

Section –B

Q.6 Attempt any five 10

a) Enlist the different types of D.C generator.
b) Give the function of yoke and pole shoes in D.C generator.
c) Why D.C series motor never started on no load?
d) What is the function of commutator in D.C machine?
e) Enlist the various losses occurring in D.C machine.
f) A 4-pole d. c shunt generator has wave wound armature with 792 conductors the flux per pole is 0.0121wb. Determine the speed at which it should run to generate 240v on no load.
g) What do you mean by armature reaction?
h) Why D.C shunt motor called as constant speed motor?

Q.7 a) Explain with neat diagram compunction of D.C machine. 05

b) Derive emf equation of D.C. generator. 05

c) An 8 pole d.c shunt generator with 778 waves. Connected armature conductor and running at 500rpm. Supplies a load of 12.5 Ω resistance at terminal voltage of 250 volts the armature resistance is 0.24 Ω and field resistance is 250Ω. Find armature current induced emf and flux per pole. 05

Q.8 a) Explain various methods of improving commutation in D.C machine. 05

b) What do you mean by field critical resistance? Explain the necessary conditions for voltage buildup of shunt generator. 05

c) Explain the various characteristics of D.C shunt generator. 05

Q.9 a) Draw and explain the torque armature current, speed armature current and speed torque characteristics of D.C series motor. 05

b) Explain various speed control methods of D.C shunt motor. 05

c) A 250 volts D.C shunt motor has armature resistance of 0.2 ohm on load it takes an armature current of 50A and runs at 750rpm if the flux of motor is reduced by 10% without changing the load torque find the new speed of motor. 05

Q.10 Attempt any three 15

1. Three point starter
2. Swinburne test
3. Armature windings in D.C machine
4. Solid state starter
5. Parallel operation of D.C generator

2016

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-245
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EEP/EE/EEE) Examination Oct/Nov 2016
Electrical Measuring Techniques
(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 from each section any two questions from the remaining questions.
III. Assume suitable data wherever necessary.

Section A

Q.1 Solve any five questions of the following. 10

i) What is the difference between accuracy and precision?
ii) Define repeatability and resolution relating to measuring instruments.
iii) Define relative error.
iv) What is mean by calibration and how it is calculated?
v) Why voltmeter should have high resistance.
vi) What are the classifications of measurement of resistance with range?
vii) Define quality factor.
viii) A moving coil instrument has the following data number of turn =150, width of coil =25mm depth of coil =35mm flux density in the gap =0.2wb/m^2. Calculate deflecting torque when carrying current 15mA.

Q.2 a) Draw and explain generalise block diagram of instrumentation system with example. 08
b) The coil of a moving coil voltmeter is 40mm long and 30mm wide and has 100 turns on it. The control spring exerts a torque of $240 \times 10^{-6} N$-m. When the deflection is 100 divisions on full scale. If the flux density of a magnetic field in the air gap is 1.0 wb/m^2 estimate the resistance that must be put in series with the coil to give one coil per division. The resistance of the voltmeter coil may be neglected. 07

Q.3 a) Explain the measurement of capacitance by using Schering Bridge. Draw the phasor diagram. 08
b) A Maxwell's bridge used for measurement of inductive impedance. Consist of following components. 07
C_1=0.01μf, R_1 =560KΩ, R_2 =6.3KΩ and R_3 =120KΩ. Find the series equivalent of unknown impedance.

Q.4 a) Explain the megger used for measurement of high resistance. 08
b) Power supplied to a three phase load was measured by two Watt meters. The readings were 7.8kw and -2.55kw. The supply voltage being 400v. Determine 07
i) Load P.F ii) total power supplied line current.

Q.5 a) Write a short note on universal shunt. 05
b) Explain de sauty bridge for measurement of capacitance. 05
c) List out the errors and method of compensation found in MI instruments. 05

Section B

Q.6 Solve any five questions of the following. 10

i) List the main parts of CRT.
ii) What is difference between dual trace and dual beam CRO?
iii) What do you mean by active and passive transducer? Give example.
iv) Classify the transducer based on quantity to measure.
v) What is meant by turn's compensation and why is it done?
vi) An energy meter designed to make 100 resolutions of disc for one unit of energy. calculate no of revolution made by it when connected to load carrying 30A at 230V and 0.5 P.F for an hour.
vii) What is nominal ratio of CT and Barden on 1.T?
viii) What happens if the secondary of CT is open circuited, while the primary carries the rated currents.

Q.7 a) Explain construction and working of single phase energy meter. 08

b) A 1-ϕ energy meter has a constant of 1200 rev/kwn. When a load of 200w is connected the disc rotates at 4.2 rpm. If the load is of 10 hrs. How many units are recorded as error, also find % error given by energy meter? 07

Q.8 a) Explain the extension of Ammeter and voltmeter range using instrument transformer. 08

b) A 1000/5A, 50 Hz CT has secondary load comprising a non-reactive resistance of 1.6Ω the primary winding has one turn. Calculate the flux in the core and the current ratio error on full load the iron loss in the core is 1.5W at full-load neglect leakage reactance. 07

Q.9 a) Draw the connection diagram and vector diagram for power measurement in 3ϕ load using two wattmeter method. 08

b) Explain the connection diagram of CT & PT in the circuit. 07

Q.10 a) Explain basic principle of resistive and inductive transducer. 08

b) Draw the connection diagram and 3ϕ energy meter and explain its working. How do we correct it if is fast moving. 07

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-278

FACULTY OF ENGINEERING AND TECHNOLOGY

S.E.(EEP/EE/EEE) Examination Oct/Nov 2016

Electrical Power Generation & its Economics

(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)Attempt any two questions from remaining four questions from each section.
iii)Assume suitable data if necessary.

Section A

Q.1 Solve any five questions 10

a) Draw the coal and ash circuit in thermal power plant.
b) Define boiler and write the types of boiler.
c) What is function of hydroelectric power plant .
d) Write the function of nuclear reactor.
e) Write the draught system.
f) Write the main components of diesel power plant.
g) What are the factors for selection of turbines.
h) What are the required equipments in coal unloading?

Q.2 a) With a neat diagram explain the operation of water tube boiler and fire tube boiler. 08

b) Write a short note on selection of coal for thermal power plant and list the site selection factors of Thermal power plant. 07

Q.3 a) Draw a general layout of a hydroelectric power plant and explain various components. 10

b) The discharge through a mansoon stream may be taken as follows 05

Month	Discharge in m^3/sec	Month	Discharge in m^3/sec
Jan	8	July	16
Feb	10	August	20
March	12	Sept	24
April	06	Oct	12
May	04	Nov	08
June	03	Dec	09

Draw a hydrograph and find i)Average discharge ii)The power developed if the working head is 15 meter and turbine generator set efficiency is 85%.

Q.4 a) Draw a neat line diagram of diesel power plant showing all the systems. 05

b) Explain the nuclear reaction in nuclear power plant. 05

c) Explain the applications of diesel power plant in different fields. 05

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

a) nuclear materials used in nuclear reactor.

b) Site selection factors of nuclear power plant.
c) Selection of coal for thermal power plant.
d) Penstock and surge tank.

Section B

Q.6 Solve any five questions. 10

a) Write the types of MHD generators.
b) Write the components of gas turbine power plant.
c) What is meant by base load plant.
d) What are the forms of geothermal energy.
e) What are the sources of non conventional power plant.
f) What are the factors affecting the cost of generation.
g) Define incremental full cost curve.
h) List the methods used for finding out the depreciation cost.

Q.7 a) Explain the comparision of all power plants. 08
b) With a neat diagram explain open cycle gas turbine power plant. 07

Q.8 a) State the advantages of tidal powerplant. 05
b) Explain the various functions of horizontal axis wind mill. 05
c) State the limitations of using solar power. 05

Q.9 a) Discuss the basic requirements of peak load plants. 05
b) Explain the choice of size & number of generator units. 05
c) Write a short note on constraints on economic generation. 05

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

a) Gas fuels in gas turbine plant
b) base load and peak load plant.
c) Cost of electrical energy
d) MHD generators.