SUBJECT CODE NO:- P-15
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(ALL-BRANCHES) Examination May/June 2017
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 questions from Q. Nos. 2, 3, 4 and 5.
iii) Solve any two questions from Q. Nos. 7, 8, 9 and 10.
iv) Use of non-programmable calculator is allowed.
v) Figures to the right indicate full marks.

Section A

Q.1 Solve any five from the following 10

a) Solve $(D^2 - 4D - 12)y = 0$

b) Solve $(D^2+2\pi D+\pi^2)y=0$

c) Find the P.I. of the equation
$(D^2 + D - 6)y = e^{2x}$

d) Find the P.I. of the equation
$(D^3 + 4D)y = sin2x$

e) Find the mean of the following data

Class	5-10	10-15	15-20	20-25	25-30	30-35	35-40
f:	6	5	15	10	5	4	3

f) Find the area under the normal curve between Z= -1.24 to 1.24

g) For a binomial distribution the mean is 12 and the variance is 4, find all the constants of the distribution.

h) A 2 lb weight – suspended from a spring stretches it 1.5 inches. If the weight is pulled 3 inches below the equilibrium position and released set up a differential equation of motion.

Q.2 a) Solve $(D^2 +2)y=e^x \cos 2x$ 05

b) Calculate the mean deviation from the median for the following data 05

Class	50-100	100-150	150-200	200-250	250-300	300-350
f:	7	18	25	31	15	4

c) An emf of 200V is in series with a 10 ohm resistor, a 1 henry inductor and 0.02 Farad capacitor At t=0, the charge Q and current I are zero. Find Q and I at any time t. 05

Q.3 a) Calculate the mean and standard deviation for the data 05

Class	68-74	75-81	82-88	89-95	96-102	103-109
f:	5	31	40	20	3	1

b) Solve without using method of variation of parameters $(D^2 + 9)\ y = \sec 3x$ 05

c) The differential equation of a cantilever beam of length l and weighing w kgs/unit, subjected to a horizontal compressive force P applied at the free end is given by 05

$EI\ \frac{d^2y}{dx^2}+Py = \frac{-1}{2}Wx^2$, *if* $y = \delta$

And $\frac{dy}{dx}=0$ *at* $x=l$ *and*

$\frac{d^2y}{dx^2}=0$ at x=0, find the maximum deflection of the beam

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Q.4 a) Solve by method of variation of parameters 05

$$(D^2+1)y = \frac{1}{1+sinx}$$

b) The income distribution of a group of 10000 persons was found to be normal with mean Rs.7500 and the standard deviation Rs.500. What is the number of persons of this group which have income 05

i) exceeding Rs.6680 ii) exceeding Rs.8320.

c) If a weight 6 lbs hangs from a spring with constant K =12 and no damping force exists, find the motion of weight when an external force 3 cos8t acts, initially x=0, $\frac{dx}{dt} = 0$ Determine whether resonance occurs. 05

Q.5 a) Solve $x^2 \frac{d^3y}{dx^3} + 3x \frac{d^2y}{dx^2} + \frac{dy}{dx} = x^2 \log x$ 05

b) Fit the curve $y = ae^{bx}$ for the data 05

X:	1	2	3	4	5	6
Y:	1.6	4.5	13.8	40.2	125	300

c) The first three moments of a distribution about the value 2 are 1, 16 and -40. Find mean, variance and μ_3 05

Also find the first three moments about x=0

Section B

Q.6 Solve any five 10

a) Find the first approximate value of the root (i.e. X_1) by Newton – Raphson method for $x e^x - 2 = 0$, correct to 3 decimal place.

b) find f (8) for the data

x	5	6	9
f(x)	12	13	14

c) Find the values of x, y, z in the first iteration by Gauss seidel method for

54x + y + z = 110

2x + 15y + 6 z = 72

-x + 6y + 27 z =85

d) Find grad ϕ at (1, -2, -1), if $\phi = 3x^2y - y^3z^2$

e) show that the vector $\bar{v} = e^x \sin y\, i + e^x \cos y\, j$ is irrotational

f)Evaluate $\int_c \bar{F}.d\bar{r}$ Where $F = x^2 i + xy j$

c: y = 0

between points (0,0) to (a,0)

g) find $\nabla^2 (r \log r)$

h) Write statement of Stoke's theorem.

Q.7 a) Solve by Gauss Seidel Method 05

10x + 2y + z = 9

2 x + 20 y - 2z = -44

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-2x + 3y + 10z =22

b) Find the directional derivative of 05

$f = x^2 - y^2 + 2z^2$ at the point

(1,2, 3) in the direction towards the point (2,1,4)

c) Show that vector field 05

$\bar{F}$= 2x ($y^2 + z^3$)i + $2x^2$yj + $3x^2z^2$K

Is conservative. Find the work done in moving a particle from

(-1,2, 1) to (2, 3, 4)

Q.8 a) Find a root of the equation correct to three decimal places 05

logx – cosx = 0

b) Show that f(r)$\bar{r}$ is always irrotational 05

c) Evaluate by Green's theorem 05

$\int_c \bar{F}.d\bar{r}$, where $\bar{F}$ = x^2i + xyj

And c is a triangle having

Vertices A (0,2) , B(2,0) and C (4,2)

Q.9 a) Find $\frac{dy}{dx}$at x = 1.9 for the data 05

x	1.1	1.3	1.5	1.7	1.9
y	0.21	0.69	1.25	1.89	2.61

b) Using stoke's theorem evaluate 05

$$\int [(x+y)dx + (2x-z)dy + (y+z)dz]$$

c

Where c is the boundary of the triangle with vertices (2,0,0), (0,3,0) and (0,0,6)

c) Show that $\bar{F}$ = (6xy + z^3)i + ($3x^2$-z)j + ($3xz^2$-y)k is irrotational. Find scalar ϕ such that F = ∇ϕ. 05

Q.10 a) Use Runge Kutta method of order 4 05

to approximate y when x=1.1,

given that y(1) = 1.2 and

$\frac{dy}{dx}$ = 3x + y^2, take h=0.1

b) Solve by Euler's modified method 05

$\frac{dy}{dx}$ = -xy^2, y(0) = 2

find y (0,2) by taking h = 0.2

c) Evaluate 05

$\iint_s \bar{F}.\hat{n}\,ds$ where

$\bar{F}$= 4xzi -y^2j + yzK and S is the surface of the cube

bounded by x=0, x = 1, y=0, y=1,z=0, z=1

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Total No. of Printed Pages:2

SUBJECT CODE NO:- P-45
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EEP/EE/EEE) Examination May/June 2017
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. No. 2 to Q. No. 5
iii. Solve any two questions from Q. No. 7 to Q. No. 10.
iv. Assume suitable data wherever necessary.

Section A

Q.1 Attempt any five 10
a) Why rating of transformer in KVA.
b) Write two comparisons of core and shell type transformer.
c) What are the losses in transformer?
d) Why parallel operation of transformer is necessary.
e) What is Ideal transformer? Draw it's no load phasor diagram.
f) Why efficiency of transformer is maximum in comparison with all electrical machines.
g) A 2200 v/220v transformer takes 0.5A. at pf of 0.3 on open circuit. Find magnetizing and active component of no load primary current.
h) Give two applications of stepper motor.

Q.2
a) Draw a complete phasor diagram for a transformer when the load power factor is lagging. 05
b) Discuss the procedure for conducting O.C and S.C test on single phase transformer. 05
c) A 10 KVA, 500 V/ 250V, 50 HZ, 1 – phase transformer has net area of cross section 90cm^2 and maximum flux density is 1.2 Tesla. Calculate the no of turns on both primary and secondary winding. 05

Q.3
a) Explain the construction details of – 3 – phase transformer with neat diagram. 05
b) Discuss the conditions to be full filled for operating two three phase transformers in parallel. 05
c) A transformer is rated at 100 KVA at full load its copper loss is 1200 watt and its iron loss is 960 watt: calculate 05
i. Efficiency at half load, unity power factor
ii. Efficiency at half load, 0- 8 power factor

Q.4
a) Explain construction and operating principle of brushless D.C motor 05
b) Explain construction and working principle of PMDC motor. 05
c) Explain the operation of D.C servo motor. 05

Q.5 Attempt any three 15
i. Open delta or V.V connection & transformer
ii. Scott connection
iii. Phaser groups & transformer as per clock notation
iv. Tertiary winding

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v. Three winding transformer.

Section B

Q.6 Solve any five 10

a) What is working principle of D.C generator?
b) What is the function of yoke in D.C machine?
c) What is the significance of back emf?
d) Why D.C shunt motors called as constant speed motors.
e) A supply voltage of D.C shunt motor is 120V and back emf is 110V. and armature resistance is 0.4Ω what is current drawn by motor?
f) Why starter is necessary for starting D.C motor.
g) What is function of commutator in D.C machine.
h) Suggest the P.C motor for following application.
   i. Lathe machine
   ii. Lift
   iii. Crane
   iv. Rolling industries

Q.7
a) Draw section of four pole D.C machine and write function of each part. 05
b) Derive emf equation of D.C generator. 05
c) A 4 pole D.C shunt generator with lap connected armature has field and armature resistance of 80Ω and 0.1Ω rept. It supplies power to 50 lamps, rated to 100 volts, 60 watt each. Calculate total armature current and generated emf. by allowing a brush drop of 1 volt per brush. 05

Q.8
a) Explain the process of voltage buildup in D.C shunt generator. 05
b) Draw and explain external characteristics of shunt and services generator. 05
c) Explain with dia speed control methods of D.C shunt motor. 05

Q.9
a) Derive torque equation of DC. Motor. 05
b) Explain and draw the various characteristics of D.C shunt motor. 05
c) A 220 V shunt motor takes 5A on no load and is running at 800 rpm. The resistance of armature and shunt field are 0.25Ω and 110Ω respt. Determine speed of motor when loaded and takes 40Amp. From the supply. 05

Q.10 Attempt any three. 15

i. Three point starter
ii. Interpotles and compensating winding
iii. Losses in D.C machines.
iv. Swinburne test
v. Solid state starter

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-76
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EEP/EE/EEE) Examination May/June 2017
Electrical Measuring Techniques
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Question No. 1 & Question No.6 are compulsory
ii) Attempt any two question from remaining question of each section
iii) Assume the suitable data whenever necessary

Section A

Q.1 Solve any five question 10

i) Differentiate between the terms repeatability and reproducibility

ii) Define the term accuracy and precision

iii) What do you mean by static calibration? Give the steps which are necessary for calibration.

iv) What is main function of the instruments:

i) Indicating function

ii) Recording function

v) A voltmeter reads 112.68 V of the true value of voltage is 112.6 V determine static error and static correction for voltmeter

vi) The measured value of resistance is 12.25Ω where as its value is 10.22Ω Determine the absolute error

vii) What are gross errors? How can these be avoided

viii) What is polyphone wattmeter?

Q.2 a) Explain the Maxwell's inductance capacitance bridge & derive expression 08

b) A bridge is used to measure the properties' of a sample of sheet steel at 2KHZ. A balance a b is test specimen arm b c is R_3 = 100 Ω,arm cd is C_4 = 0.1 μF and arm da is R_2 = 834 Ω in series with capacitor C_2 = 0.124μF calculate the effective impedance of the specimen under test. 07

Q.3 a) Explain construction and working of pmmc instrument with figure 08

b) A moving coil instrument has the following data : number of turns = 100 width of coil = 20 mm, depth of coil 30 mm, flux density in the gap is 0.1 w b/m^2 calculate the deflecting torque when carrying current of 10mA . Also calculate deflection if the control spring constant is 2 x 10^{-6} N-M / degree 07

Q.4 a) Device the expression for power measurement in 3Ø circuit by 2- wattmeter method for balance Star connected load and draw the phasor diagram 08

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b) A 3 Ø 440 v motor load has a power factor of 0.76. The two wattmeter connected to measure the power show the input to be 30 kw kind the reading on each instrument 07

Q.5 a) Explain the working & derive expression for measurement of capacitance by Schering bridge & draw the phasor diagram 08

b) State the explain types of errors in wattmeter 07
i) errors due to friction
ii) error due to pressure coil capacitance
iii) error due to stray field

Section B

Q.6 Solve any five question 10
i) What are the applications of CRO?
ii) What are different types of amplifiers used in CRO?
iii) What is meant by ratio error and phase angle error in CTS?
iv) what is meant by turn compensation and why is it done?
v) How does PT differs form a power transformer?
vi) What is transducer? What are functions of transducer in electronic instrumentation system?
vii)A 5A , 230 v meter on full load unity p.t test makes 60 evaluation in 360sec off the normal disc speed is 480 rv / kwh what the percentage error.
viii) what are the error caused due to driving system in 1 Ø energy meter?

Q.7 a) Explain contraction & working of 1 Ø Induction type energy meter and derive the expression for average torque 08

b)A 230 v, 50 HZ, 1 Ø energy meter has a constant of 200 rev / kwhr. While supplying a non-inductive of 5.2A at normal voltage. The meter takes 4 minutes for 10 revolution. Calculate the percentage error of the instrument 07

Q.8 a)What are advantage and disadvantages of capacitive transducers 07

b) Explain the measurement can be made with the use of CRO 08
i) Frequency ii) phase angle

Q.9 a) what are advantages of instrument transformers over shunt and multiplies? 07

b) List the error and adjustment of error in 1 Ø Induction type energy meter state how to eliminate it 08

Q.10 a) Explain the following in relation to a PT 08
i) Effect of change in secondary burden
ii)effect of change in frequency

b) Explain the working of law power factor watt meter 07

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Total No. of Printed Pages:3

SUBJECT CODE NO:- P-109
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EEP/EE/EEE) Examination May/June 2017
Electrical Power Generation & its Economics
(Revised)

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

Please check whether you have got the right question paper.

N.B 1)Q.No.1 and 6 are compulsory
2) Attempt any two question from remaining four question from each section
3) Assume suitable data if necessary
4) figure to the right indicates full marks

Section A

Q.1 Solve any five question 10

a) what is water hammer

b) what is function of penstock and surge tank

c) What is hydrograph

d) How does air pre heating save fuel

e) what is the function of condenser in steam power plant

f) why thermal power stations are situated by the side of river or lake

g) what is meant by chain reaction & nuclear fission

h) what are advantages of diesel power plant

Q.2 a) state essential element of hydroelectric power plant in a sketch & explain function of important parts 5

b) what do you mean by 5
i) hydrology
ii) spill way
iii) storage
iv) pondage
v) trash rack

c) Write short note on nuclear waste disposal 5

Q.3 a) What is function of 5
i) superheater
ii) deaerator
iii) Economizer
iv) chimney

v) steam nozzel in thermal power plant

b) explain code handing stages in thermal power plant 5

c) Explain Ash handling system any one in details in thermal power plant 5

Q.4 a) Explain with diagram various components od nuclear reactor 5

b) write main components of diesel power plant with functions 5

c) draw & explain patron wheel 5

Q.5 a)Draw the hydrograph & find average monthly flow 5

Month	Discharge m^3/s	Month	Discharge m3/s
Jan	1000	July	2500
Feb	800	Aug	3000
Mar	600	Sept	2400
Apr	500	Oct	2000
May	200	Nov	1500
June	1500	Dec	1500

b) Which factor are considered for nuclear power plant site selection 5

c) Explain with diagram any one element of thermal power plant 5

Section B

Q.6 Solve any five 10

a) Explain gas plant fuel
b) Applications where solar energy used
c) forms of geothermal energy
d) Draw sketch of wind power mill
e) Draw VI characteristics of photo voltaic cell
f) List method of finding depreciation cost
g) Differentiate between fixed cost & operating cost
h) Draw input output curve of thermal power plant

Q.7 a) Which method are adopted for increasing efficiency of gas power plant 5

b) which are comports of gas power plant explain with their function operation 5

c) why gas plant used as peak load power plants 5

Q.8 a) explain MHD power generation 5

b) write Advantages & disadvantages of tidal power plant 5

c) Explain solar power 5

Q.9 a) Describe in brief cost of electrical energy 5

b) comparison of All power plant 5

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c) write down benefits of inter connected system 5

Q10 a) Explain base load & peak load power plant 5

b) which are constrains of economic power generation 5

c) The input output characteristics of a 70 MW thermal power station is $I = 5x10^6(10+8L+0.4L^2)$ 5
where I is in KJ / m & 'L' is in mw. find load at which plant runs at maximum efficiency

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-143
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EEE) Examination May/June 2017
Electronics Devices and Circuit
(Revised)

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

Please check whether you have got the right question paper.

N.B

Section A

Q.1 Solve any five (compulsory) 10

a) What is peak inverse voltage?
b) Define rectifiers. list the types of rectifiers
c) Why do we need filter in a power supply?
d) What is a voltages multiplier?
e) Draw constructional details of enhancement MOSFET?
f) What is ripple factor /
g) What is Q point /

Q.2 Draw the circuit diagram of full wave rectifiers a) with center tap connection and b) bridge connation. Explain their working .What is the peak – inverse voltages of a diode in each case? 15

Q.3 a) An ac supply of 230V is applied to a half wave rectifier circuit through a transformer of turns ratio 20:1 if the load resistance is 1KΩ 08
Find a) dc output voltages
b) Maximum value of output voltages
c) D C load current
d) Maximum value of load current

b) compare C, L and L-C filter 07

Q.4 a) Explain working of a depletion MOSFET. 08
b) Draw the V-I characteristics of N channel JFET 07

Q.5 Write short notes on the following 15

a) Voltages feedback biasing
b) Load and line regulation
c) Enhancement MOSFET

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Section –B

Q.6 Solve any five (compulsory) 10

a) What is an amplifier?
b) What is need of heat sink
c) List out advantages of class- c amplifiers
d) What is Miller's Theorem
e) What is wide band amplifier?
f) Why most of the power amplifier used in practice are designed to operate in class AB stages
g) What is negative feedback in amplifier

Q.7 a) Compare CE, CC and CE configurations 07

b) Explain the operation of transformer coupled two stages amplifier. State its advantages and disadvantages. 08

Q.8 Describe the static input and output characteristics of CE configuration of a transistor with neat circuit diagram. 15

Q.9 a) What is the effect of cascading of amplifier stages on gain and bandwidth? explain in detail 08

b) Explain class –A amplifier and its characteristics in detail 07

Q.10 Write short notes on the following 15

a) Crystal oscillators
b) Push pull amplifier
c) LC oscillator

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-147
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE) Examination May/June 2017
Electrical Engineering Materials
(Revised)

[Time:ThreeHours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B 1) Q1 and Q6 are compulsory
2) Solve any two questions from the remaining from each sections

Section A

Q.1 Solve any five 10
a) Define
i) Magnetization
ii) Magnetic dipole
b) State the factors affecting breakdown strength
c) State the effect of photo-conduction.
d) What is pyro-electricity
e) What is dielectric loss?
f) What is polarization?

Q.2 a) What is polarizability? Explain electronic and orientation polarization 08
b) Explain the properties and applications of ceramics 07

Q.3 a) Explain the insulating materials used for rotating machines 07
b) Explain the materials used for power capacitors and power cables 08

Q.4 a) Explain the magnate materials used in 08
i) Power transformer
ii) Memory disc
b) State the different breakdown mechanism. Explain any one of them. 07

Q.5 Write notes on (any three) 15
a) SF6
b) Transformer oil
c) Insulating resins
d) Ferro electricity

Section B

Q.6 Solve any five 10
a) Differentiate in between low and high resistive materials.
b) State the applications of Nano-wires.
c) State the general properties of good conductor
d) What is thermocouple?
e) What is alloying?
f) State the electric properties of Nano-tubes

Q.7 a) Explain the various conducting mechanism in Nano-structures. 08
b) Explain the risk factors involved in Nano-technology 07

Q.8	a)	Explain the materials used for transmission lines.	07
	b)	Explain the different alloys for different types of fuses	08
Q.9	a)	How will you measure resistivity of resistive materials in your lab?	08
	b)	Explain the testing of high voltage cables	07
Q.10	Write a notes on (any three)		15
	a)	Molecular machines	
	b)	Soldering materials	
	c)	Superconductivity	
	d)	Concept of energy bands	

Total No. of Printed Pages:3

SUBJECT CODE NO:- P-220
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (All Branches) Examination May/June 2017
Engineering Mathematics -IV
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.No.1 from and Q.No.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 from the following: 10

a. Find the analytic function whose imaginary part is e^xsiny.

b. Show that u= $\bar{e}^{\theta}$ cos (log r) is harmonic.

c. Find the image of the line y=2x, under the transformation W=Z^2

d. Evaluate $\int_0^{1+i}(x^2 - iy)dz$ along the line y=x.

e. Evaluate $\int_c \frac{e^z}{z}$ dz, where c is $|z|$=1

f. Find the poles of the function and the corresponding residues at each pole of f(z)= $\frac{ze^z}{(z+1)^3}$

g. Solve $\frac{\partial u}{\partial x}=\frac{2\partial u}{\partial t}$+u, where u(x, 0)=$6e^{-3x}$.

OR

Find the Z-transform of f(k) =k, k≥ o.

h. Solve $\frac{\partial^2 z}{\partial x \partial y}$=sinx.

OR

Find the Z-transform of e^{-ak},k≥0,

Q.2 a. Show that the function f(z)=e^x(cosy + i sin y) is analytic and find its derivative. 05

b. Find the bilinear transformation which maps the point z=-1, 0, 1 onto the points W=0,i,3i. 05

c. Find the Z-transform of $\frac{\cos 2k}{k}$, k≥o. 05

OR

Solve $\frac{\partial^2 y}{\partial t^2}=C^2\frac{\partial^2 y}{\partial x^2}$, subject to the conditions 05
Y(0,t)=0, Y(l,t)=0, $\partial y/\partial t$ =0 at t=0
And y(x,0)=$\frac{3a}{2l}$x, 0≤ $x \leq \frac{2l}{3}$
=$\frac{3a}{l}$(l-x), $\frac{2l}{3} \leq x \leq l$.

Q.3 a. Find k such that f(x, y)=x^3+3kxy^2 may be harmonic and find its conjugate harmonic function. 05

b. Evaluate $\int_c \bar{z}^2 dz$, Where c is $|Z-1|$=1. 05

c. Find the inverse Z-transform of $\frac{Z}{(z-2)(z-3)}$,$|Z| > 3$. 05

OR

Solve $\frac{\partial u}{\partial t}=\alpha^2\frac{\partial^2 u}{\partial x^2}$ for o< $x<\pi, t>o$ 05

$\frac{\partial u}{\partial x}$ =0 at x=0, $\frac{\partial u}{\partial x}$=0 at x= π and u(x, o) =sinx.

Q.4 a. Expand f(z)=$\frac{1}{(z+1)(z+2)}$ for 0< $|Z-1|<1$. 05

b. Evaluate $\oint_c \frac{sinz}{(z-1)^2(z^2-9)}$ dz, where c is $|Z-3|=\frac{1}{2}$. By cauchy's integral formula. 05

c. Solve the difference equation by Z-transform u_{K+2}-2u_{k+1}+u_k=2^K, with Y_o=2, Y_1=1. 05

OR

Solve $\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}$=0, subject to the conditions 05

u(0, y) = u(π, y)=0 for all y ≥ 0 and u(x, 0)=100 u(x, ∞)=0.

Q.5 a. Under the transformation W=Z+$\frac{a^2}{z}$, show that the map of the circle $x^2+y^2=a^2$ is a straight line, but the map of the circle $x^2+y^2=b^2$ (b>a) is an ellipse. 05

b. Evaluate $\oint_c \frac{z^2}{\sin^3 z\cos z}$ dz, where c is $|Z+i|$=2 by cauchy's Residue theorem. 05

c. Evaluate $\int_{-\pi}^{\pi}\frac{1}{1+\sin^2\theta}d\theta$, by using Residue theorem. 05

Section-B

Q.6 Solve any five from the following: 10

a. Find Laplace transform of $te^{-2t}\delta(t-2)$.

b. Find L[$f(t)$] and L[$f'(t)$] of the following function f(t)=3, 0≤ $t<5$

=0, t>5.

c. Find the Laplace transform of f(t)= $(t-2)^2$,t>2

=0, t<2

d. Find inverse Laplace transform of$\frac{2s+2}{s^2+2s+10}$

e. Find inverse Laplace transform of $\frac{e^{-\pi s}}{s^2+9}$

f. find inverse Laplace transform of $s^{\frac{-7}{2}}$

g. Find the Fourier cosine transform of f(x)=k, 0<x<a

=0,x>a

h. Find the Fourier transform of f(x)= x, 0<x<a

=0, other wise

Q.7 a. Find the Laplace transform of$\int_o^t \frac{1+\bar{e}^t}{t}$dt. 05

b. Find the inverse Laplace transform of $\tan^{-1}\frac{2}{5}$ 05

c. Using Fourier transform , solve the equation $\frac{\partial u}{\partial t}$ =2$\frac{\partial^2 u}{\partial x^2}$, 0<x<∞, t>0 05

Subject to the conditions

u(0,t)=0, t>0, u(x,0)=e^{-x}, x>0,

u and $\frac{\partial u}{\partial x}$ →0 as x→ ∞.

Q.8 A. Evaluate $\int_0^\infty e^{-5t}\sinh^3 t\,dt$ 05

b. Find the inverse Laplace transform by convolution theorem of $\frac{1}{s(s^2+4)}$ 05

c. Find f(x) satisfying the integral equation $\int_0^\infty f(x)sin\lambda x dx=\frac{sin\lambda}{\lambda}$ 05

Q.9 Express the following function in terms of Heaviside unit step function and hence find their Laplace transform 05

F(x)=sin t, 0<t<π

=t, t>π

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b. Solve $y'' - 6y' + 9y = t^2e^{3t}$, y(0)=2, y' (0)=6 by Laplace transform. 05

c. Find the Fourier sine transform of 05

f(x)=x, 0<x<1

=2-x, 1<x<2

=0, x>2

Q.10 a. Find the Laplace transform of f(t)= e^t, 0<t<2π , f(t)=f(t+2π). 05

b. Solve $\frac{dx}{dt}$+y=sin t , $\frac{dy}{dt}$+x=cost, X(0)=2, y(0)=0 by Laplace transform. 05

c. Find the Fourier transform of f(x)=$\frac{1}{2a}$, if $|x| \leq$a 05

=0, if $|x|$>a.

Total No. of Printed Pages:5

SUBJECT CODE NO:- P-247

FACULTY OF ENGINEERING AND TECHNOLOGY

S.E. (EEP/EE/EEE) Examination May/June 2017

Network Analysis

(Revised)

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

Please check whether you have got the right question paper.

N.B
i) Use suitable data if required.
ii) Q.No.1 from section A and Q.No.6 from section B are compulsory.
iii) Solve any two questions from the remaining questions in each section A and B.

Section A

Q.1 Solve any five (2x5) 10

i. Define convolution integral.
ii. State the Thevenin theorem.
iii. Define linear and nonlinear network.
iv. Give principle of duality
v. What are magnetically coupled circuits.
vi. State compensation theorem.
vii. What is significance of critical conditions
viii. Define and give characteristics of unit step function

Q.2 A Write short note on duality and dual network 05

B Compute the voltage v for the coupled circuit in fig.1 05

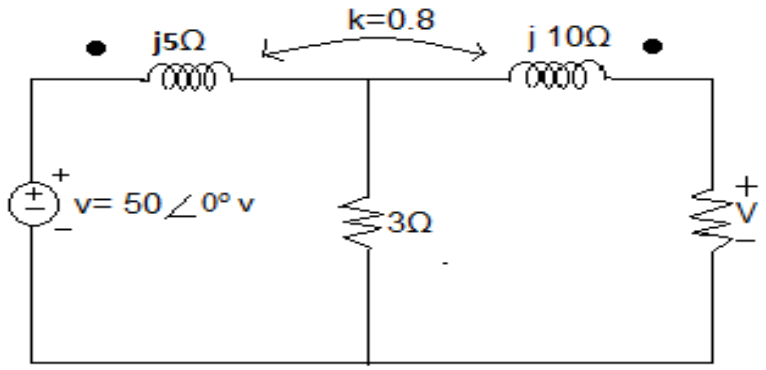

Fig 1

C Replace the network at terminals A-B with Thevenin equivalent circuit. 05

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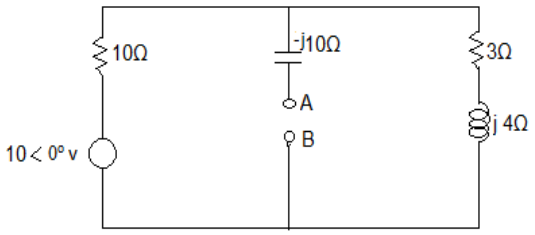

Fig 2

Q.3 A Find how many seconds after t=0 has the current i (t) become one half of its initial value in the given circuit in fig 3 05

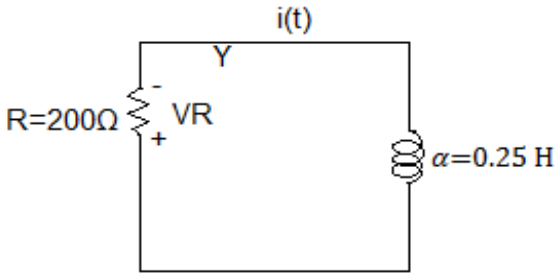

Fig 3

B The switch is closed t=0 find value of i, $\frac{di}{dt}, \frac{d^2i}{dt^2}$ at t=0$^+$. Assume initial current of inductor to be zero . 05

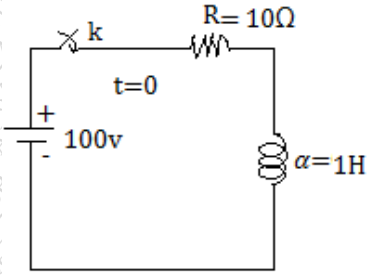

Fig 4

C Find out the Laplace transform of f(t)= e^{-at} for t≥ 0. 05

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Q.4 A Find the Laplace transform of the waveform shown in fig.5 05

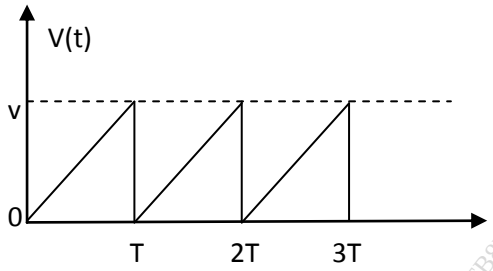

fig 5

B Find inverse Laplace transform of given F(s) 05

F(s)=$\frac{s+2}{s(s+3)(s+4)}$

C Obtain the inverse Laplace transform of given F(s) 05

F(s) =$\frac{s-2}{s(s+1)^3}$.

Q.5 A Write the advantages of s domain network. 05

B Derive the transform impedance and of induction and capacitor. 05

C Find the dimming point impedance of the given one port network shown in fig 6. 05

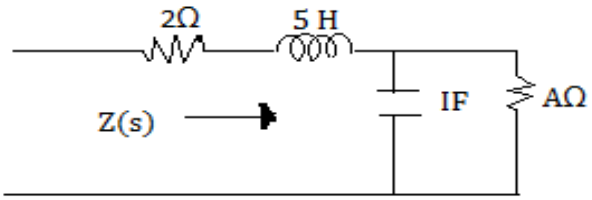

Fig 6

Section B

Q.6 Solve any five 10

i. Define pole and zero of a network function.
ii. Write the Y parameter of two port network.
iii. Define RMS value of an alternating quantity.
iv. List the network function of two port n/w
v. Test whether the following represent driving point immittances $\frac{S^2+3S+2}{S^2+6S+9}$.
vi. What is complex frequency?
vii. What is Fourier series? What are the applications of Fourier transform.
viii. What is physical significance of reactive power?

Q.7 A If I(s) = $\frac{3s(s+2)}{(s+1)(s+4)}$ plot poles and zeros in s plane and obtain time domain response i(t) 05

B Plot the poles and zeros of the network function F(s) = $\frac{s(s+1)}{(s+3)(s^2+4s+5)}$ 05

C Derive the inter conversion to connect h parameter into z parameters. 05

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Q.8 A Find h parameters for the network 05

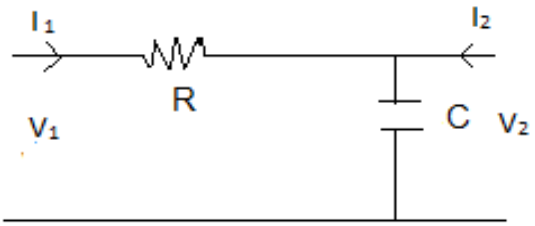
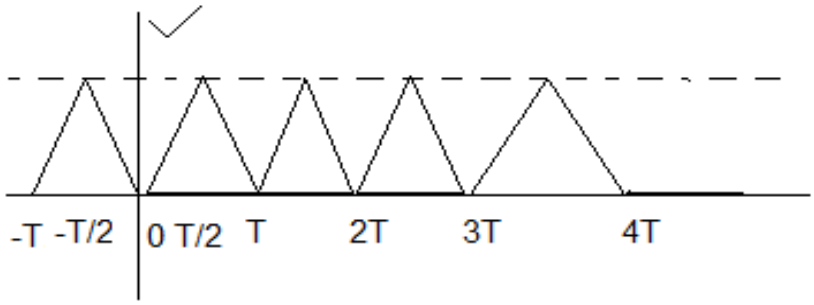


Fig 7

B State the limitations on pole and zero location in transfer function of two port network. 05

C What is the power transfer optimization what are the problems in optimizing power transfer 05

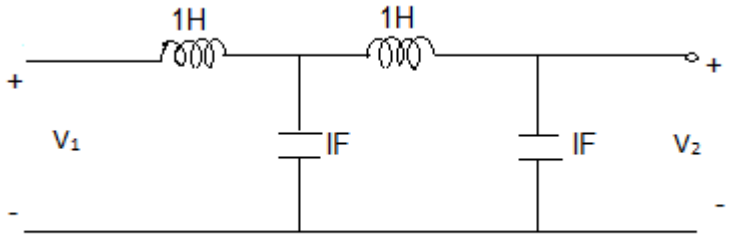
Q.9 A Find the Fourier coefficients of waveform f (t). 05



B Write short note on insertion loss 05

C Explain in detail average power and complex power. 05

Q.10A Find the network functions $\frac{V_1}{I_1}$ for the network fig. 9 05



B For the following network show. 05
$\frac{v_2}{v_1} = \frac{1}{s^2+3s+1}$ in fig.10

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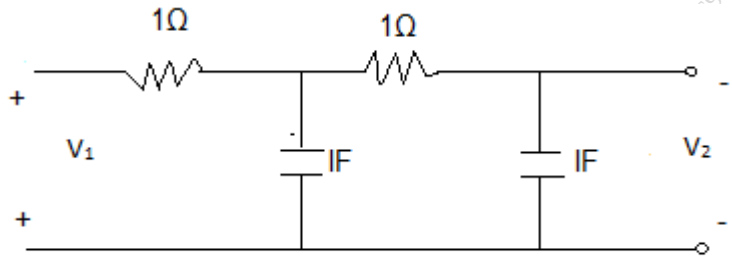

C Write short note on half wave symmetry. 05

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-278
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE) Examination May/June 2017
Electrical Power Transmission & Dist.
(Revised)

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

Please check whether you have got the right question paper.

N.B 1) Question (1) & (6) are compulsory.
2) Attempt any two Questions from (2) to (5) from Section A.
3) Attempt any two Questions from (7) to (10) from Section B.

Section A

Q.1 Attempt any five 10
a) Define string efficiency, will it be equal to 100%
b) If supply frequency increase, then skin effect is ……. Clarify
c) Define following terms
i) Feeder (ii) Distributor
d) What are constants of overhead line
e) What is transposition & why it is adopted
f) Define load factor and demand factor
g) Why sub-stations are required.
h) What are desirable properties of insulator?

Q.2 (1) What is tariff? Explain its types 05
(2) Define terms Load Curve, Load factor, demand factors, diversity factor and load duration curve 05
(3) Explain requirements of distribution systems 05

Q.3 1) What are different types of insulators? Write a note on Pin type insulators with neat sketch 05
2) In a 33Kv overhead line, there are three units in string of insulators. If capacitance between each insulator pin & earth is 11% of self-capacitance of each insulator. 05
3) What are surge arrestors? Where and why do we use these equipment's. 05

Q.4 (1) Derive expression of Inductance of three phase line with its unsymmetrical spacing 05
(2) Explain any one method of improving string efficiency. 05
(3) Write a note on GMR and GMD 05

Q.5 Write short notes on (Any three) 15
a) Ring main and Radial Distribution System
b) Proximity effect
c) Different types of loads in power system
d) Skin effect.

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Section B

Q.6 Attempt any five 10

a) What is mean by short, medium, long transmission line?
b) What is concept of self GMD in case of inductance of transmission line
c) i) Self GMD is depends on ……..
ii) Mutual GMD depends on…….
d) What is meant by transposition of conductor & why
e) Write any four differences between Nominal T and TT method
f) What are effects of lagging & leading power factors of load on voltage regulation
g) What is function of armouring and lead sheathing in cable?
h) State any two assumptions made while drawing equivalent circuit of nominal T network of medium transmission line.

Q.7
1. Find value of ABCD constants of medium transmission line when represented as normal TT circuit and AD – BC = 1 05
2. Derive expression for capacitance of three phase line with unequilateral spacing. 05
3. An Over Head three phase transmission line delivers 5000 Kw at 22 KV at 0.8 Lag power factor. The resistance and reactance of each conductor is 4 Ω and 6 Ω respectively, Determine 05
a) Sending end voltage
b) Percentage regulation
c) Transmission efficiency

Q.8
1 Discuss various types of line supports 05
2. Explain nominal T network with vector diagram. 05
3. An overhead 3Ø 50 Hz 132 Kv transmission line has conductors placed in horizontal plane 4.56m apart conductor diameter is 22.4 mm. If the line length is 100 kms. 05
Calculate charging current per phase assuming complete transporisition

Q.9
1. Draw a neat sketch of underground cable. Explain its construction. 05
2. Explain four factors affecting corona. 05
3. Discuss suitability of various types of overhead lines 05

Q.10 Write short notes on any three 15
(1) Grading of cables
(2) GMR & GMD
(3) ABCD parameters
(4) Capacitance of long transmission line

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-310
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE) Examination May/June 2017
A.C. Machines
(Revised)

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

Please check whether you have got the right question paper.

N.B
1. Q.no.1 and Q.No.6 are compulsory.
2. Solve any two questions from Q. no. 2 to 5.
3. Solve any two questions from Q. No. 7 to 10.
4. Assume suitable data, if required.

Section A

Q.1 Solve any five of the following 10

a) Define slip. What is standstill slip?
b) State the necessity of starting in 3 -ph induction motor and enlist the different starters used.
c) Draw the torque – slip characteristics of 3 – ph induction motor.
d) A 3 – ph, 6 pole, squirrel cage induction motor runs at 960 r. p .m. what will be the frequency of rotor current?
e) Define the term crawling.
f) Enlist the various methods for speed control of an induction motor.
g) Write any four point of comparison between single – phase and 3 – phase induction motor.
h) Write applications of AC servomotor.

Q.2 a) In an induction motor show that the starting torque is proportional to the square of applied voltage i.e. $\tau_{st} \propto v^2$. 07

b) A 3 – ph, 6 – pole, 50 Hz induction motor has a slip of 1 % at no load and 3% at full load, determine. 08

1. Synchronous speed
2. No-load speed
3. Full load speed
4. Frequency of rotor current at standstill
5. Frequency of rotor current at full load

Q.3 a) Explain in detail the torque – slip and torque – speed characteristics of 3 – ph induction motor. 07

b) With neat circuit diagram explain the working of direct – on – line starter in 3 – ph induction motor. 08

Q.4 a) Explain in detail the double – revolving – field theory of single phase induction motor 07

b) Draw the phase diagram of single phase induction motor with load & explain. 08

Q.5 Write short note on the following (any -3) 15

a) Speed control of induction motor by pole changing method.
b) AC servomotor
c) Double – cage induction motor
d) FHP synchronous motor.

Section B

Q.6 Solve any five of the following 10

a) State any two advantages of short pitching or chording in an alternator.
b) Describe armature leakage reactance.
c) Define voltage regulation. Enlist the methods used to determine the voltage regulation in cylindrical rotor type alternator.
d) A synchronous generator has 9 slots per pole, if each coil span is 8 slot pitches what is the value of pitch factor?
e) State the necessity for parallel operation of alternator.
f) Enlist the different torques considered in selection of synchronous motor.
g) State various causes of hunting in synchronous motor.

Q.7 a) Derive an EMF equation of alternator. 07

b) A 3 – phase, 6 pole, star connected alternator revolves at 1000 r. p. m. The stator has 90 slots and 8 conductors per slot. The flux per pole is 0.05 Wb (sinusoidally distributed). Calculate the voltage generated by machine if the winding factor is 0.96. 08

Q.8 a) Explain voltage regulation by synchronous impedance method in synchronous generator. 07

b) A 3 – phase, star connected alternator is rated at 1600KVA, 13500V. The armature effective resistance and synchronous reactance are 1.5Ω and 30Ω respectively, Per phase. Calculate the percentage regulation for a load at 1280 KW at power factors of 08

i. 0.8 leading
ii. Unity
iii. 0.8 lagging

Q.9 a) Draw the phase diagram of synchronous motor and explain in detail the effect of load changes on a synchronous motor. 07

b) A 6600v, 3 – phase, star connected synchronous motor draws a full load current of 80A at 0.8 p.f. leading. The armature resistance is 2.2Ω and synchronous reactance 22Ω per phase. If stray losses of the machine are 3200W, determine the 08

i. The e.m.f induced
ii. The output power
iii. The efficiency

Q.10 Write short note on following (any 3) 15

a) Methods of synchronizing in alternator
b) Voltage regulation in alternator
c) Synchronous motor V – curves
d) Synchronous motor as synchronous condenser.

2017

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-375
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE) Examination May/June 2017
Analog & Digital Circuits
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.Nos.1 and Q.No.6 are compulsory.
ii) Attempt from each section any two questions from the remaining questions.
iii) Assume suitable data whenever necessary.
iv) Figure to the right indicates full marks.

Section A

Q.1 Solve any five. 10
i. Draw the input characteristics of CE mode and label all variable.
ii. List the advantages and disadvantages of FET over Bipolar transistor.
iii. Define push-pull amplifier
iv. Draw the circuit diagram for voltage regulator of IC LM317
v. What is multistage amplifier circuit?
vi. Define an operational amplifier?
vii. What is I to V converter
viii. State high-pass filter?

Q.2 a. Explain the working of transformer coupled amplifier with suitable diagram. 08
b. Describe the consumption of FET with symbol. 07

Q.3 a. What is the instrumentation amplifier? what are the basic requirement of an instrumentation amplifier? Explain. 08
b. What is comparator? How op-amp can be used as comparator? 07

Q.4 a. What is active filter? What is the role of the amplifier of the active filter? 08
b. Explain the operation of 555 timer in monostable mode with neat circuit and waveform. 07

Q.5 a. Write short note on (any three) 15
i. Peak detector
ii. BJT configurations
iii. Schmitt trigger
iv. Voltage regulator

Section B

Q.6 Solve any five 10
i. Why are NAND and NOR gates known as universal gates.
ii. Convert decimal no- 22.64 to hexadecimal number
iii. Simplify the Boolean function
F(x,y,z)=$\sum(1,2,3,6,7)$ using three variable k-map.
iv. List the different types of shift- registers.
v. Draw the logic diagram of master slave flip flop
vi. What is mean by up-down counter

2017

vii. Define static and dynamic RAM.

viii. What is the difference between multiplexer and Demultiplexer.

Q.7 a. Simplify the Boolean function 08

F (ABCD)=m $\sum(0,1,2,4,5,6,8,9,12,13,14)$ using k-map method.

b. Represent decimal no. 8620 in 07

i) BCD code

ii) Excess-3 code

iii) Hexadecimal

iv) Octal no.

Q.8 a. Explain the operation of clocked SR flip- flop with logic diagram and excitation table. 08

b. Describe the operation of twisted ring counter. 07

Q.9 a. Explain the operation of PROM and EPROM. 08

b. What do you mean by a selector? Draw the logic circuit for 4- input mux and explain its operation with truth table. 07

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

i. Gray code

ii. Digital to analog converter

iii. Shift register

iv. De-Morgan's theory.