Seat No.	

B.Tech. (Electronics) (Part - II) (Semester - III) (CBCS) Examination, November - 2019
ENGINEERING MATHEMATICS - III
Sub. Code : 73232

Day and Date : Saturday, 23 - 11 - 2019 **Total Marks : 70**
Time : 10.00 a.m. to 12.30 p.m.

Instructions : 1) All questions are compulsory.
2) Figure to the right indicates full marks.
3) Use of non-programmable calculator is allowed.

Q1) Choose the correct answer in each of the following. **[14]**

a) The complete solution of $(D^3+2D^2+D)y=0$ is y =

i) $c_1+(c_2+c_3x)e^{-2x}$ ii) $c_1+(c_2+c_3x)e^{-x}$

iii) $c_1+c_2e^{2x}+c_3e^{-x}$ iv) $c_1+(c_2+c_3x)e^{x}$

b) If $\phi=4xyz^2+3xy^2z$ then $\nabla\phi$ at (1, –1, –2) is

i) 22i–28j+19k ii) –22i+28j+19k

iii) 22i+28j–19k iv) none of these

c) If $\overline{F}=xyz\,i+3x^2y\,j+(xz^2-y^2z)k$ then div $\overline{F}$ at (2, –1, 1) is

i) 14 ii) –14

iii) –2i+12j+3k iv) 2i+12j–3k

d) Let X = {p, q, r, s, t, u} and $A(x)=\frac{0.1}{p}+\frac{0.3}{q}+\frac{0.5}{r}+\frac{1}{s}+\frac{0.7}{t}+\frac{0.2}{u}$ then

$^{0.5+}$A is

i) {r, s, t} ii) {p, s, t}

iii) {s, t} iv) {p, q, s, t}

e) If two fair coins are tossed simultaneously then probability of getting exactly 2 heads is

i) ½ ii) ¾

iii) ¼ iv) 1

P.T.O.

f) $L\left(e^{-4t}t\right)$ is

i) $\frac{1}{(s-4)^2}$ ii) $\frac{s}{s^2+4}$

iii) $\frac{1}{s+4}$ iv) $\frac{1}{(s+4)^2}$

g) $L^{-1}\left(\frac{1}{s^2+4s+4}\right)$ is

i) $e^{2t}t$ ii) t^2e^t

iii) te^{-2t} iv) te^t

Q2) Attempt any two of the following **[14]**

a) Solve $4x^2\frac{d^2y}{dx^2}+y=19\cos(\log x)+22\sin(\log x)$

b) If the fuzzy sets A and B are defined by

$$A(x)=\frac{0.8}{5}+\frac{0.5}{4}+\frac{0.7}{3}+\frac{0.3}{2}+\frac{0.1}{1},\ B(x)=\frac{1}{1}+\frac{0.8}{2}+\frac{0.7}{3}+\frac{0.6}{4}+\frac{0.5}{5}$$

Find $A\cup B$, $A\cap B$ and $\overline{A}\cap\overline{B}$

c) Find the constants a. b. c if the directional derivative of $\phi(x,y,z)=axy^2+byz+cx^2z^3$ at (1,2, –1) has maximum magnitude 64 in the direction parallel to the z axis.

Q3) Attempt any two of the following. **[14]**

a) Solve $\left(D^4-3D^2-4\right)y=5\sin 2x-e^{-2x}$

b) If the fuzzy sets A and B are defined by

$$A(x)=\frac{0.3}{x1}+\frac{0.9}{x2}+\frac{0.7}{x3}+\frac{0.6}{x4}+\frac{0.1}{x5},\ B(x)=\frac{0.2}{x1}+\frac{0.4}{x2}+\frac{0.5}{x3}+\frac{0.7}{x4}+\frac{0.9}{x5}$$

calculate the degree of subset hood S(A, B) and S(B, A).

c) If $\bar{r}$ is the position vector of a point (x, y, z) and r is the modulus of $\bar{r}$ then prove that $r^n\bar{r}$ is an irrotational vector for any value of n but is solenoidal only if n = –3.

Q4) Attempt any two of the following **[14]**

a) Obtain the Fourier series expansion for

$f(x) = x \sin x \quad \text{for} \quad -\pi < x < \pi$

b) Find Laplace Transform of $e^{2t}\dfrac{1-\cos 2t}{t}$

c) 1% of articles produces by a certain machine are defective. What is the probability of

i) No defective

ii) one defective

iii) two defective articles in sample of 100.

Q5) Attempt any two of the following **[14]**

a) Expand $f(x) = \pi x \quad 0 < x < 1$

$= 0 \quad 1 < x < 2$

with period 2 into Fourier Series.

b) Find Inverse Laplace Transform of $\dfrac{s^2}{(s^2+1)(s^2+9)}$ by using convolution theorem.

c) An aptitude test for selecting engineers in an industry is conducted on 100 candidates. The average score is 42 and standard deviation is 24. Assuming normal distribution for the score find.

i) the number of candidates whose score is more than 60

ii) the number of candidates whose score lies between 30 and 60

(Given : S.N.V.z area for z = 0 to z = 0.75 is 0.2734, for z = 0 to 0.5 is 0.1915)

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S.Y.B. Tech. (Semester - III) (CBCS)
Examination, November - 2019
ELECTRONICS MEASUREMENT AND INSTRUMENTATION
Sub. Code: 73233

Day and Date : Tuesday, 26 - 11 - 2019 **Total Marks : 70**

Time : 10.00 a.m. to 12.30 p.m.

Instructions : 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever necessary.

Q1) a) C.R.O. gives_____. **[14]**

i) Actual representation

ii) Visual representation

iii) Approximate representation

iv) Incorrect representation

b) Oscilloscope is _____.

i) A ohmmeter ii) An ammeter

iii) A voltmeter iv) A multimeter

c) Electron beam is deflected in_____.

i) 1 direction ii) 4 direction

iii) 3 directions iv) 2 directions

d) CRO is a_____.

i) Fast x-y plotter ii) Slow x-y plotter

iii) medium x-y plotter iv) not a plotter

e) CRO can't display microseconds time.

i) True ii) False

P.T.O.

f) CRT is the heart of CRO.

i) True ii) False

g) Typically oscilloscope represents_____.

i) Current and time ii) Resistance and time

iii) Voltage and time iv) Power and time

h) Mechanical transducers sense_____.

i) Electrical changes ii) Physical changes

iii) Chemical changes iv) Biological change

i) Mechanical transducers generate_____.

i) Electrical signals ii) Chemical signals

iii) Physical signals iv) Biological signals

j) Electrical transducers generate_____.

i) Biological signals ii) Chemical signals

iii) Physical signals iv) Electrical signals

k) Electrical signals are easy to amplify.

i) True ii) False

l) The power needs of electrical transducers is_____.

i) Maximum ii) Minimum

iii) zero iv) Infinite

m) Change in output of sensor with change in input is_____.

i) Threashold ii) Slew rate

iii) Sensitivity iv) None of the mentioned

n) Smallest change which a sensor can detect is _____.

i) Resolution ii) Accuracy

iii) Precision iv) Scale

Q2) Solve Any two **[14]**

a) What is Error? Explain different types of errors in measurement.

b) Explain successive approximation type DVM with neat block diagram.

c) Explain with neat block diagram Dual Beam CRO.

Q3) Solve any two **[14]**

a) Explain Ohm-meter in detail.

b) Explain Digital frequency meter with neat block diagram.

c) Explain with neat block diagram Digital Storage CRO.

Q4) Solve Any Two **[14]**

a) Explain Thermocouple. What is cold junction compensation?

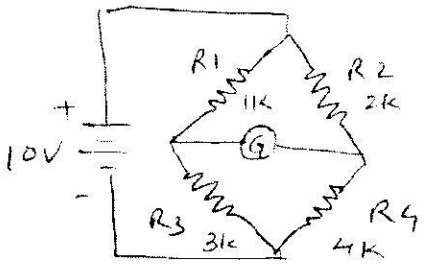
b) Explain Kelvins Bridge. Write drawback of wheatstones bridge.

c) Explain Pulse generator with neat block diagram.

Q5) Solve Any Two **[14]**

a) Explain Capacitive transducer in detail.

b) An unbalanced wheatstones Bridge is shown in fig. Find current through the Galvanometer.



c) Explain Fourier analyzer with neat block diagram.

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Seat No.	

S.Y. B.Tech. (Electronics Engineering) (Semester - III) Examination, November - 2019

ELECTRONICS CIRCUIT DESIGN - I

Sub. Code : 73234

Day and Date : Thursday, 28 - 11 - 2019 **Total Marks : 70**

Time : 10.00 a.m. to 12.30 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to the right indicates full marks.**
3) **Assume suitable data, if necessary.**
4) **Std. data sheets/tables, non programmable calculators are allowed.**

Q1) Fill in the blanks with correct answer and rewrite the complete statement. **[14]**

a) The forward voltage drop across a silicon diode is about _____.

i) 2.5V ii) 3V

iii) 10V iv) 0.7V

b) A zener diode is always _____ connected.

i) reverse ii) forward

iii) either reverse or forward iv) none of the above

c) A zener diode is destroyed if it _____.

i) is forward biased

ii) is reverse biased

iii) carries more than rated current

iv) none of the above

d) The PIV rating of each diode in a bridge rectifier is _____ that of the equivalent Centre-tap rectifier.

i) one-half ii) the same as

iii) twice iv) four times

P.T.O.

e) Which of the following is not a necessary component in a clamper circuit?

i) Diode ii) Capacitor

iii) Resistor iv) Independent DC Supply

f) A differentiator is a _____.

i) High pass R-C Circuit with a large time constant

ii) Low pass R-C Circuit with a very small time constant

iii) Low pass R-C Circuit with a large time constant

iv) High pass R-C Circuit with a very small time constant

g) The form factor for half wave rectified sine wave is _____.

i) 1.0 ii) 1.11

iii) 1.44 iv) 1.57

h) The potential divider bias used in amplifier to

i) limit the input AC signal going to the base

ii) reduce DC base current

iii) reduce the cost of the circuit by limiting the number of resistors

iv) make the operating point almost independent of β

i) The ideal value of stability factor is

i) 1 ii) 5

iii) 10 iv) 100

j) If a JFET has IDSS=8mA and VP=4V, then R_{DS} equals

i) 200 Ω ii) 320 Ω

iii) 500 Ω iv) 5K Ω

k) As compared to transistor amplifier JFET amplifier has

i) Higher voltage gain, less input impedance

ii) Less voltage gain, less input impedance

iii) Less voltage gain, higher input impedance

iv) Higher voltage gain, higher input impedance

l) In an RC coupled amplifier, the voltage gain over mid-frequency range _____.

i) Changes abruptly with frequency

ii) Is constant

iii) Changes uniformly with frequency

iv) None of the above

m) RC coupling is not used to amplify extremely low frequencies because _____.

i) There is considerable power loss

ii) There is hum in the output

iii) Electrical size of coupling capacitor becomes very large

iv) None of the above

n) If the collector supply is 10V, then collector cut off voltage under d.c. conditions is _____.

i) 20 V

ii) 5 V

iii) 2 V

iv) 10 V

Q2) Attempt any Two. **[14]**

a) In a center-tapped full wave rectifier, the rms half secondary voltage is 9V. Assume ideal diodes and load resistance RL = 1KΩ. Find.
   i) Peak Current
   ii) DC Voltage
   iii) Ripple factor

b) Explain :-
   i) Protection circuits for regulator
   ii) Line regulation and Load Regulation

c) A 100 Vpp symmetrical square wave having a period of 100μS is applied as the input to RC differentiator having time constant of 10mS. Sketch the output and calculate the dc values of output.

Q3) Attempt any Two. **[14]**

a) With circuit diagram explain Voltage Tripler and Quadrupler Circuits.

b) Explain "C" filter using center tapped full wave rectifier. Draw necessary waveforms. Derive equation for ripple factor.

c) Design a series pass voltage regulator to provide output voltage of 12V at 50mA. The unregulated input is 20V.

Q4) Solve any Two. **[14]**

a) Derive generalize equations for Av, Ai Ri and Ro for CE amplifier using hybrid parameters.

b) Derive stability factor for voltage divider biasing of CE amplifier.

c) Design single stage R-C coupled CE amplifier considering following data : V_{CC} = 12V, Av = 150, f_L = 50Hz, f_H = 20KHz, hie = 4.5kohm, R_S = 500 ohm, R_L = 2 Kohm, hfe = 330 and stability factor = 5.

Q5) Solve any Two. **[14]**

a) Explain working and construction of Enhancement type MOSFET with all characteristics.

b) What is h-parameter? Determine h-parameters using characteristics of BJT connected in CE mode and explain hybrid equivalent circuit.

c) Explain CS amplifier for FET with suitable characteristics, mention its applications.

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Total No. of Pages : 3

Seat No.	

S.Y.B. Tech. (Electronics) (Part-II) (Semester - III) (CBCS) Examination, November - 2019

ANALOG COMMUNICATION

Sub. Code: 73235

Day and Date : Saturday, 30 - 11 - 2019 **Total Marks : 70**

Time : 10.00 a.m. to 12.30 p.m.

Instructions : 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data, if necessary.**

Q1) To each of following questions four alternatives have been given. Select the appropriate alternative as the answer. **[14]**

a) In frequency modulated signal with frequency deviation is 75 and if modulating signal frequency is 1 KHz KHz. Band width required will be

i) 100 KHz ii) 152 KHz
iii) 160 KHz iv) 200 KHz

b) In an amplitude modulated system, if total power is 600 W carrier power is 400 W then modulation index is

i) .5 ii) .75
iii) .9 iv) 1

c) Angle modulated signal expressed by e=Cos ($2\times10^{8}\pi$ t+75Sin $2\times10^{3}\pi$ t). Peak frequency deviation of carrier is then.

i) 75 Khz ii) 1 KHz
iii) 3.2 KHz iv) 7.5 KHz

d) In TDM system each signal is allotted in frame unique and fixed

i) frequency slot ii) phase slot
iii) time slot iv) amplitude slot

e) Aliasing occurs when the Nyquist rate is

i) 2 fm ii) 3 fm
iii) 2.5 fm iv) 1.2 fm

P.T.O.

f) The PWM needs

i) more power than PPM
ii) more bandwidth than PPM
iii) more samples per second than P
iv) none of these

g) Modulation index of AM wave is changed from 0 to 1. The transmitted power is

i) unchanged ii) increased by 50%
iii) halved iv) quadrupled

h) In AM receiver if intermediate frequency is 455 KHz image frequency at 2000 KHz will be

i) 2910 KHz ii) 2010 KHz
iii) 2900 KHz iv) None of these

i) Balanced modulator is used in generation of which of the following.

i) DSB-SC signal ii) PM signal
iii) FM signal iv) PAM signal

j) FM signal can be detected by using

i) LPF ii) Discriminator
iii) BPF iv) Average detector

k) Two resistors 20k and 50k are in series at room temperature (290°K). At the bandwidth of 100KHz thermal noise voltage is ($K=1.38\times10^{-23}$J/K)

i) 10.59 μV ii) 11.59 μV
iii) 09.59 μV iv) 12.59 μV

l) Limiter is not essential in following detector:

i) balanced slope ii) ratio
iii) foster-seeley iv) none

m) Which one of the following blocks is not common in both AM and FM receiver.

i) RF amplifier ii) If amplifier
iii) Mixer iv) Slope detector

n) PLL can be used to demodulate

i) Am signal ii) FM signal
iii) SSB signal iv) USB-Sc signal

Q2) Solve Any two **[14]**

a) Derive the expression for amplitude modulated wave which contains three terms carrier, USB and LSB

b) Explain working of balanced modulator with circuit diagram

c) Explain in brief Burst noise and partition noise

Q3) Solve any two **[14]**

a) Describe how Bessel's functions are useful for determining bandwidth with proper mathematical expression.

b) Compare AM and FM systems with their spectrum.

c) Write note on Thermal Noise

Q4) Solve Any Two **[2×7=14]**

a) Explain the following performance parameters for radio receiver.

i) Sensitivity

ii) Selectivity

iii) Fidelity

b) Explain with block diagram P.L.L. method for detection of frequency modulated signal.

c) Differentiate between natural Sampling and flat top sampling.

Q5) Solve Any Two **[14]**

a) Explain negative peak clipping and diagonal peak clipping.

b) Compare TDM and FDM

c) With circuit diagram Explain ratio detector for demodulation of FM signal.

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Total No. of Pages : 4

Seat No.	

S.Y. B. Tech. (Electronics Engg.) (Semester - III) (CBCS) (Revised) Examination, December - 2019

LINEAR CIRCUITS

Sub. Code : 73236

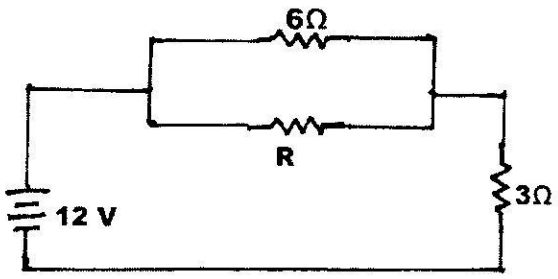
Day and Date : Tuesday, 3 - 12 - 2019 **Total Marks : 70**

Time : 10.00 a.m. to 12.30 p.m.

Instructions : 1) All questions are compulsory.
2) Use suitable assumptions if required.
3) Use nonprogrammable calculator.

Q1) Select correct options from given multiple choices. **[14]**

a) To have transfer of maximum power from source to 3Ω resistor, the value of resistor R will be equal to _____.



i) 2Ω ii) 6Ω
iii) 16Ω iv) 9Ω

b) The network has 7 nodes and 5 independent loops. The number of branches in the network is _____.

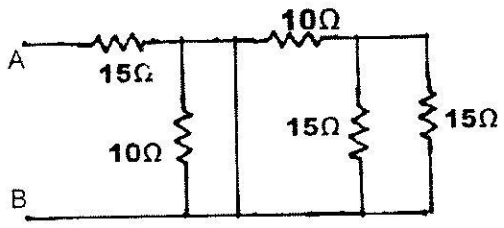
i) 13 ii) 12
iii) 11 iv) 10

c) In series RLC circuit R = 10Ω, L = 0.01 H and C = 100 μF. The quality factor Q of circuit at resonance is _____.

i) 1 ii) 10
iii) 0.1 iv) 100

P.T.O.

d) For the network given below the equivalent resistor looking through terminals A and B is _____.



i) 10Ω ii) 25Ω
iii) 15Ω iv) 15.5Ω

e) For a two port reciprocal network, the three transmission parameters are given by A = 4, B = 7 and C = 5. The value of D is equal to _____.

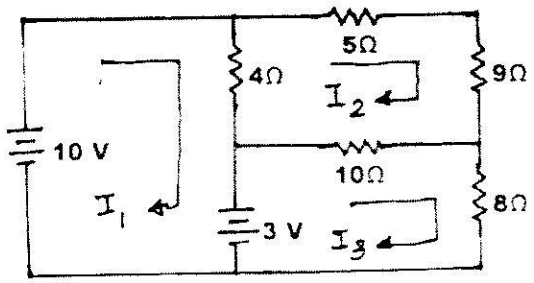
i) 8.5 ii) 9
iii) 9.5 iv) 8

f) A stable system must have
i) Zero or negative real part for poles and zeros.
ii) At least one pole or zero lying in the right half s - plane
iii) Positive real part for any pole or zero
iv) Negative real part for all poles and zeros.

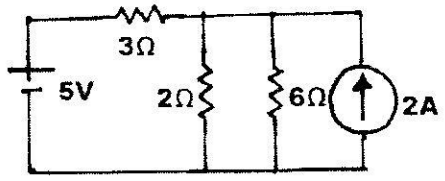
g) In band elimination filter, the frequency of resonance of individual arms is geometric _____.
i) Mean of two cut-off frequencies
ii) Difference of two cut-off frequencies
iii) Product of two cut-off frequencies
iv) Division of two cut-off frequencies

Q2) Solve any TWO. **[14]**

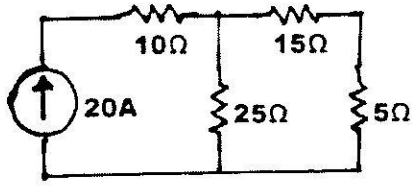
a) Using mesh analysis find the loop currents I_1, I_2 and I_3 in the circuit given below.



b) In the network given below find the current I through resistor 2 Ω using superposition theorem.



c) Find the voltage across 5 Ω resistor and verify the reciprocity theorem for the circuit given below.

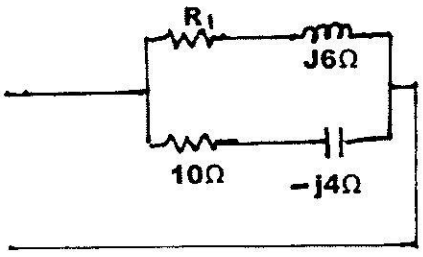


Q3) Answer any TWO. **[14]**

a) For series RLC circuit derive the equation for the frequency at which voltage across the capacitor and inductor is maximum.

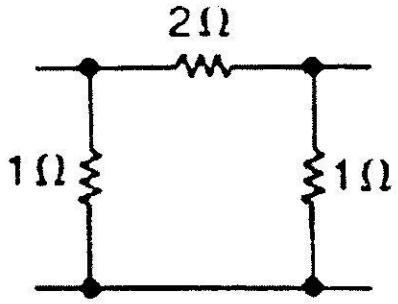
b) A variable inductor, a resistor and capacitor are connected in series across 200 V, 50 Hz source. The maximum current obtained by varying inductance is 0.314 A. The voltage across capacitor at resonance is measured to be 300 V. Find vales of R, L, C of circuit.

c) Find the value of resistor R_1 in given below circuit so that circuit will resonate.

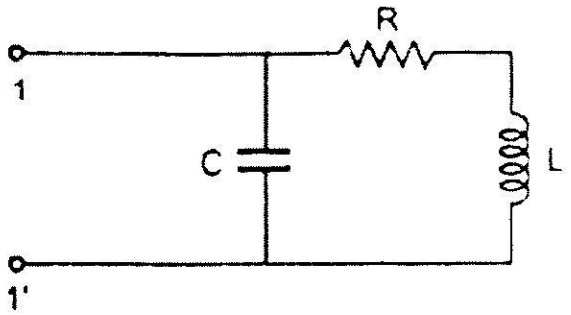


Q4) Answer any TWO. **[14]**

a) Two identical sections of network shown in figure are connected in parallel. Obtain 'Y' parameters of resulting network.



b) Find driving point admittance function for the given one port network.



c) What is attenuator? Derive design equations for symmetrical T-type attenuator.

Q5) Answer any TWO. **[14]**

a) Derive the equations for Y parameters in terms of Z parameters.

b) Explain the significance of poles and zeros.

c) Design an m derived low pass filter (T and π section) having design resistance $R_0 = 500\,\Omega$, cut off frequency $f_c = 1500$ Hz and infinite attenuation frequency $f_\infty = 2000$ Hz.

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