CBCS SCHEME

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18MAT31

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Transform Calculus, Fourier Series and Numerical Techniques

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Find the Laplace transform of:

(i) $\left(\frac{4t+5}{e^{2t}}\right)^2$ (ii) $\left(\frac{\sin 2t}{\sqrt{t}}\right)^2$ (iii) $t\cos at$. **(10 Marks)**

b. The square wave function f(t) with period 2a defined by $f(t)=\begin{cases}1 & 0\le t<a\\ -1 & a\le t<2a\end{cases}$. Show that $\left(\frac{1}{s}\right)\tanh\left(\frac{as}{2}\right)$. **(05 Marks)**

c. Employ Laplace transform to solve $\frac{d^2y}{dt^2}-\frac{dy}{dt}=0,\ y(0)=y_1(0)=3$. **(05 Marks)**

OR

2 a. Find (i) $L^{-1}\left\{\frac{s^2-3s+4}{s^3}\right\}$ (ii) $\cot^{-1}\left(\frac{s}{2}\right)$ (iii) $L^{-1}\left\{\frac{s}{(s+2)(s+3)}\right\}$ **(10 Marks)**

b. Find the inverse Laplace transform of, $\frac{1}{s(s^2+1)}$ using convolution theorem. **(05 Marks)**

c. Express $f(t)=\begin{cases}2 & \text{if } 0<t<1\\ \frac{t^2}{2} & \text{if } 1<t<\frac{\pi}{2}\\ \cos t & t>\frac{\pi}{2}\end{cases}$ in terms of unit step function and hence find its Laplace transformation. **(05 Marks)**

Module-2

3 a. Obtain the Fourier series of $f(x)=\begin{cases}2 & -2<x<0\\ x & 0<x<2\end{cases}$. **(08 Marks)**

b. Find the half range cosine series of, $f(x)=(x+1)$ in the interval $0\le x\le 1$. **(06 Marks)**

c. Express $f(x)=x^2$ as a Fourier series of period 2π in the interval $0<x<2\pi$. **(06 Marks)**

OR

4 a. Compute the first two harmonics of the Fourier Series of f(x) given the following table :

x°	0	60°	120°	180°	240°	300°
y	7.9	7.2	3.6	0.5	0.9	6.8

(08 Marks)

b. Find the half range size series of e^x in the interval $0 \le x \le 1$. (06 Marks)

c. Obtain the Fourier series of $f(x) = \frac{\pi^2}{12} - \frac{x^2}{4}$ valid in the interval $(-\pi \quad \pi)$ (06 Marks)

Module-3

5 a. Find the Infinite Fourier transform of $e^{-|x|}$. (07 Marks)

b. Find the Fourier cosine transform of $f(x) = e^{-2x} + 4e^{-3x}$. (06 Marks)

c. Solve $u_{n+2} - 3u_{n+1} + 2u_n = 3^n$, given $u_0 = u_1 = 0$. (07 Marks)

OR

6 a. If $f(x) = \begin{cases} 1 & \text{for } |x| \le a \\ 0 & \text{for } |x| > a \end{cases}$, find the infinite transform of f(x) and hence evaluate $\int_0^\infty \frac{\sin x}{x} dx$. (07 Marks)

b. Obtain the Z-transform of $\cosh n\theta$ and $\sinh n\theta$. (06 Marks)

c. Find the inverse Z-transform of $\frac{4z^2 - 2z}{z^3 - 5z^2 + 8z - 4}$ (07 Marks)

Module-4

7 a. Solve $\frac{dy}{dx} = e^x - y$, $y(0) = 2$ using Taylor's Series method upto 4^{th} degree terms and find the value of $y(1.1)$. (07 Marks)

b. Use Runge-Kutta method of fourth order to solve $\frac{dy}{dx} + y = 2x$ at x = 1.1 given $y(1) = 3$ (Take h = 0.1) (06 Marks)

c. Apply Milne's predictor-corrector formulae to compute y(0.4) given $\frac{dy}{dx} = 2e^x y$, with (07 Marks)

x	0	0.1	0.2	0.3
y	2.4	2.473	3.129	4.059

OR

8 a. Given $\frac{dy}{dx} = x + \sin y$; y(0) = 1. Compute y(0.4) with h = 0.2 using Euler's modified method. (07 Marks)

b. Apply Runge-Kutta fourth order method, to find y(0.1) with h = 0.1 given $\frac{dy}{dx} + y + xy^2 = 0$; y(0) = 1. (06 Marks)

c. Using Adams-Bashforth method, find y(4.4) given $5x\left(\frac{dy}{dx}\right) + y^2 = 2$ with

x	4	4.1	4.2	4.3
y	1	1.0049	1.0097	1.0143

(07 Marks)

Module-5

9 a. Solve by Runge Kutta method $\frac{d^2y}{dx^2} = x\left(\frac{dy}{dx}\right)^2 - y^2$ for $x = 0.2$ correct 4 decimal places, using initial conditions $y(0) = 1,\ y'(0) = 0,\ h = 0.2$. **(07 Marks)**

b. Derive Euler's equation in the standard form, $\frac{\partial f}{\partial y} - \frac{d}{dx}\left[\frac{\partial f}{\partial y'}\right] = 0$. **(06 Marks)**

c. Find the extramal of the functional, $\int_{x_1}^{x_2} y^2 + (y')^2 + 2ye^x dx$. **(07 Marks)**

OR

10 a. Apply Milne's predictor corrector method to compute $\frac{d^2y}{dx^2} = 1 + \frac{dy}{dx}$ and the following table of initial values:

x	0	0.1	0.2	0.3
y	1	1.1103	1.2427	1.3990
y′	1	1.2103	1.4427	1.6990

(07 Marks)

b. Find the extramal for the functional, $\int_0^{\frac{\pi}{2}} \left[y^2 - y'^2 - 2y\sin x\right]dx$; $y(0) = 0$; $y\left(\frac{\pi}{2}\right) = 1$. **(06 Marks)**

c. Prove that geodesics of a plane surface are straight lines. **(07 Marks)**

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CBCS SCHEME

USN | | | | | | | | | | |

18EE32

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Electric Circuit Analysis

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Setup nodal equations for the circuit of Fig.Q1(a) and then find the power supplied by 5 – V source.

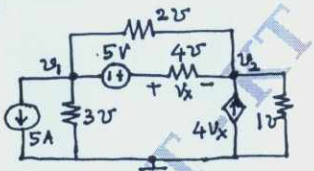

Fig.Q1(a) **(08 Marks)**

b. Making use of source shifting procedure, simplify the circuit of Fig.Q1(b) in such a way that the voltage V_X is determined.

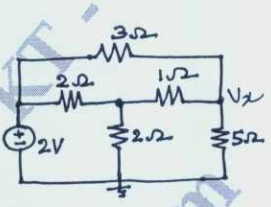

Fig.Q1(b) **(06 Marks)**

c. Use mesh analysis to determine the branch currents in the network indicated in Fig.Q1(c).

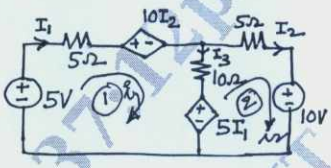

Fig.Q1(c) **(06 Marks)**

OR

2 a. Find 'Req' for the network shown in Fig.Q2(a) across A and B.

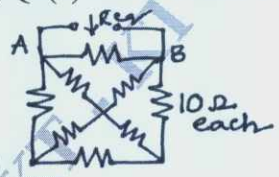

Fig.Q2(a) **(06 Marks)**

b. Draw the exact dual of the network shown in Fig.Q2(b) by writing Kirchhoff's law equations.

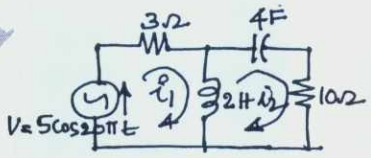

Fig.Q2(b) **(08 Marks)**

c. Reduce the network of Fig.Q2(c) to a form with only one current source across terminals using source transformation (terminals A and B).

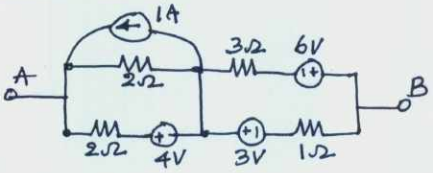

Fig.Q2(c) **(06 Marks)**

Module-2

3 a. Find the Thevenin's equivalent circuit at the terminals A and B of the circuit in Fig.Q3(a).

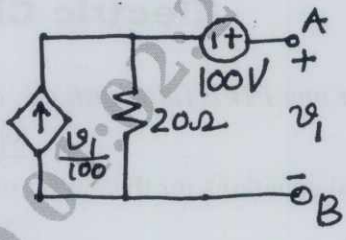

Fig.Q3(a) **(08 Marks)**

b. Find the value of R_L in the network shown in Fig.Q3(b) that will absorb a maximum power and specify the value of that power.

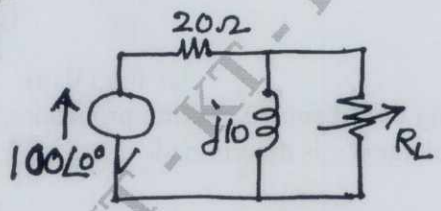

Fig.Q3(b) **(06 Marks)**

c. In the network shown in Fig.Q3(c) the voltage source of 5V causes a current I in the 2Ω resistor. Find 'I'. Verify the reciprocity theorem.

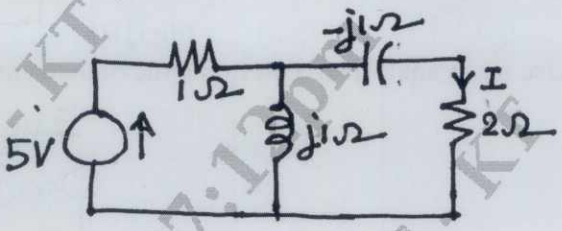

Fig.Q3(c) **(06 Marks)**

OR

4 a. In the network shown in Fig.Q4(a) determine the nodal voltage V_2 using superposition theorem.

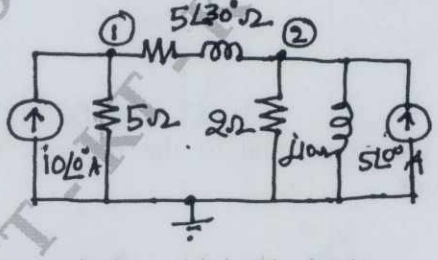

Fig.Q4(a) **(08 Marks)**

b. Use Thevenin's theorem to find current in $R_L = 6\Omega$ in Fig.Q4(b).

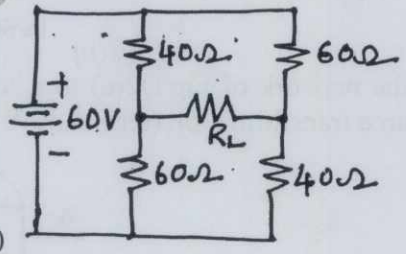

Fig.4(b) **(08 Marks)**

c. State and prove Millman's theorem. **(04 Marks)**

Module-3

5 a. Derive an expression for resonant frequency 'f_0' for the general parallel resonant circuit show in Fig.Q5(a).

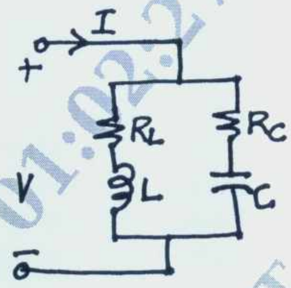

Fig.Q5(a)

(08 Marks)

b. Fig.Q5(b) shows a network with zero capacitor voltage and zero inductor current when the switch 'K' is open. At t = 0 the switch 'K' is closed. Solve for :

i) V_1 and V_2 at $t = 0^+$

ii) $\frac{dv_1}{dt}$ and $\frac{dv_2}{dt}$ and $t = 0^+$

iii) V_1 and V_2 at $t = \infty$

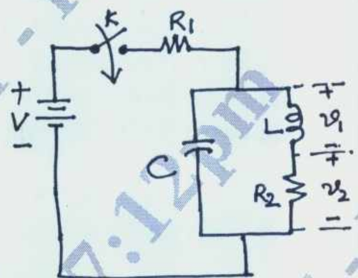

Fig. Q5(b)

(12 Marks)

OR

6 a. Fig.Q6(a) shows a RCL parallel circuit excited by a DC current source. At t = 0, the switch K is opened. Find v(t).

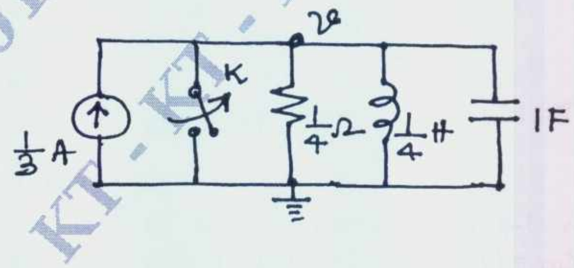

Fig.Q6(a)

(08 Marks)

b. A 400V, 200Hz AC source is connected in series with a capacitor and a coil whose resistance and inductance are 20mΩ and 6mH respectively. If the circuit is in resonance at 200Hz, find :

i) Value of capacitor

ii) V_g A/C the capacitor

iii) Maximum energy stored (instantaneous) in the coil

c. iv) The half – power frequencies. **(08 Marks)**

What are initial conditions in network? Write the equivalent form of the network elements interms of the initial conditions. **(04 Marks)**

Module-4

7 a. Find the Lapalce transform of the square wave shown in Fig.Q7(a).

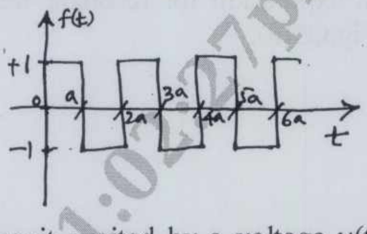

Fig.Q7(a) **(08 Marks)**

b. Fig.Q7(b) shows a series R–L–C circuit excited by a voltage v(t) = 12 sin 5t. The initial current in the circuit is 5A and the initial voltage a/c capacitor is one volt with polarity shown. Find i(t) using Lapalce transformation method.

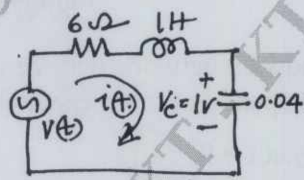

Fig.Q7(b) **(08 Marks)**

c. State and prove the initial–value theorem in the context of Lapalce transformation. **(04 Marks)**

OR

8 a. A rectangular voltage pulse of unit height and duration 'T' is applied to a series R–C combination at t = 0. Determine the voltage across the capacitance 'C' as a function of time. Use Laplace transformation method. **(10 Marks)**

b. Find the Laplace transforms of the two different functions given below and sketch the waveforms. i) sin (wt) u(t t$_0$) ii) sin w(t – t$_0$) u(t – t$_0$). **(10 Marks)**

Module-5

9 a. A symmetrical 3 - ϕ, 100V, 3-wire supply feeds an unbalanced star-connected load with impedances of the load as ZR = $5\angle 0°$ Ω, ZY = $2\angle 90°$ Ω and ZB = $4\angle -90°$ Ω. Find the line currents, voltage across the impedances and the displacement natural voltage. Also calculate the power consumed by the load. Draw the phasor diagram sequence RYB. Take VRY as ref. **(10 Marks)**

b. For the circuit of Fig.9(b) find Z-parameters. Hence calculate transmission (ABCD) parameters. Find whether the network is symmetrical? Reciprocal?

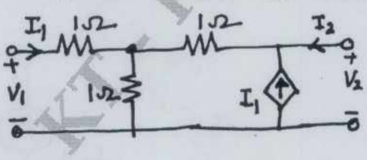

Fig.Q9(b) **(10 Marks)**

OR

10 a. A 3-ϕ delta connected load has Z_{RY} = (100 + j50)Ω, Z_{YB} = (20 – j75)Ω and Z_{BR} = (70.7 + j70.7)Ω and it is connected to balanced 3 - ϕ, 400V supply. Determine the line currents, power consumed by the load. Sketch the phasor diagram. Assume RYB phase sequence and take V_{YB} as the reference phasor. **(10 Marks)**

b. For the circuit shown in Fig.Q10(b) find Y-parameters. Is the network symmetrical? Reciprocal?

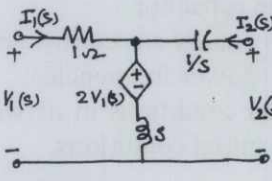

Fig.10(b) **(10 Marks)**

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18EE35

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Digital System Design

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Write the truth table of the logic circuit having and inputs a, b and c and an output $y = a\bar{b}\bar{c} + \bar{a}bc + abc$. Also simplify the Boolean expression and implement the logic circuit using NAND gates only. **(06 Marks)**

b. Minimize the following multiple output functions using K-map
i) $f_1(a, b, c, d) = \Sigma m(1, 5, 7, 8, 9, 10, 11, 13, 15)$
ii) $f_2(a, b, c, d) = \Sigma m(1, 2, 6, 7\ 8, 13, 14, 15) + \Sigma d(3, 5, 12)$. **(10 Marks)**

c. Define Canonical Minterm form and canonical Maxterm form. **(04 Marks)**

OR

2 a. Convert the following Boolean function into their proper canonical form in decimal notation.
i) $f = \bar{a}b + bc$ ii) $f = (\bar{x} + y)(y + \bar{z})$. **(08 Marks)**

b. Simplify using Quine-Mccluskey minimization technique for the following function.
$f(w, x, y, z) = \Sigma(0, 1, 4, 5, 9, 11, 13, 15)$. **(12 Marks)**

Module-2

3 a. Design a combinational circuit that will multiply two 2-bit numbers. **(12 Marks)**

b. Implement full subtractor using 3 : 8 line decoder with active high outputs and active low enable input. **(08 Marks)**

OR

4 a. Implement the following using 8 to 1 MUX with a, b, c as select lines
$f(a, b, c, d) = \Sigma(0, 1, 5, 6, 7, 9, 10, 15)$ **(08 Marks)**

b. Implement a 1-bit comparator using 2 : 4 decoder 74139. **(04 Marks)**

c. Design a priority encoder for a system with three inputs, with the middle bit with highest priority encoding to 10, the MSB with the next priority encoding to 11, while the LSB with the least priority encoding to 01. **(08 Marks)**

Module-3

5 a. With a neat diagram, explain the working of master–slave JK flip-flop along with waveforms. **(10 Marks)**

b. Explain switch debouncer using SR latch with waveforms. **(10 Marks)**

OR

6 a. Write the characteristic equation of SR, JK, D and T flip-flops. **(08 Marks)**

b. Differentiate sequential logic circuit and combinational logic circuit. **(04 Marks)**

c. Explain the operation of SR latch with an example. **(08 Marks)**

Module-4

7 a. Design a 4-bit register using positive edge triggered D-flip-flop to operate as indicated in the table below :

Mode select		Data line selected	Register operation
a_1	a_0		
0	0	d_0	Hold
0	1	d_1	Shift right
1	0	d_2	Shift left
1	1	d_3	Parallel load

(12 Marks)

b. Design a 4-bit mod-8 Johnson counter and also write the count sequence table. **(08 Marks)**

OR

8 a. Design a 4-bit binary ripple up counter using positive edge triggered t-flip-flop with a count enable line. Write the counting sequence and relevant timing diagram. **(08 Marks)**

b. Design a synchronous counter to count the sequence 0, 1, 4, 6, 7, 5 and repeat using positive edge triggered JK flip-flops. **(12 Marks)**

Module-5

9 a. Explain Mealy and Moore model in a sequential circuit analysis. **(08 Marks)**

b. Design a sequential circuit using D-flip-flop for the state diagram. Show below in Fig.Q9(b). **(12 Marks)**

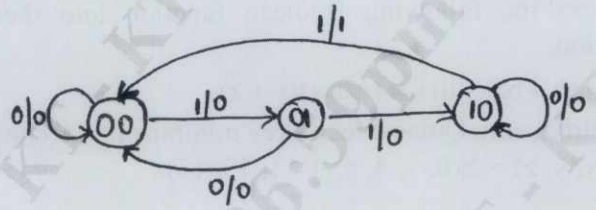

Fig.Q9(b)

OR

10 a. Construct the excitation table, transition table, state table and state diagram for the Moore sequential circuit shown in Fig.Q10(a). **(12 Marks)**

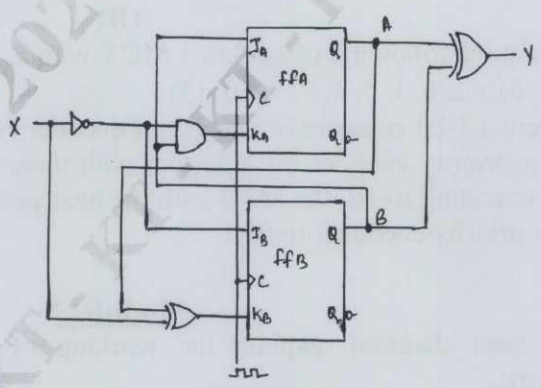

Fig.Q10(a)

b. Write short notes on :
i) ROM ii) RAM iii) EPROM iv) Flash Memory. **(08 Marks)**

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CBCS SCHEME

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18EE36

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Electrical and Electronic Measurements

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define 'Voltage Sensitivity' of a Galvanometer. Obtain an expression for bridge sensitivity S_b in terms of voltage sensitivity and bridge parameters. When will the bridge sensitivity be maximum? **(07 Marks)**

b. Explain the necessity of Earthing. Explain measurement of Earth Resistance by fall of potential method. **(06 Marks)**

c. Explain Maxwell Inductance capacitance bridge and derive its balance equation. **(07 Marks)**

OR

2 a. Explain the significance of 'low resistance' measurement. With a neat circuit diagram, explain Kelvin Double Bridge and derive its balance equation. **(08 Marks)**

b. The four arms of an ac bridge have impedance values of $Z_1 = 400\angle 50^\circ$ ohm, $Z_2 = 200\angle 40^\circ$ ohm, $Z_3 = 800\angle -50^\circ$ ohm and $Z_4 = 400\angle 20^\circ$ ohm. Find whether the bridge is balanced under this working condition. **(04 Marks)**

c. With a neat circuit diagram, explain modified De-Sauty bridge for measurement of capacitance of an imperfect capacitor and derive its balance equation. **(08 Marks)**

Module-2

3 a. Derive the torque equation of a single phase Dynamometer type Wattmeter. **(07 Marks)**

b. Explain the various adjustments required in Energy meter for the accurate reading. **(06 Marks)**

c. With a neat sketch, explain the construction and working of a single phase Dynamometer type Power Factor meter. **(07 Marks)**

OR

4 a. Explain: i) Phase sequence Indicators ii) Determination of power factor of a balanced three phase load, using Wattmeter readings W_1 and W_2 obtained from two Wattmeter method of power measurement. **(08 Marks)**

b. Explain the various errors and adjustments in Dynamometer type Wattmeter. **(06 Marks)**

c. With a neat sketch, explain the construction and working of Weston frequency meter. **(06 Marks)**

Module-3

5 a. What are shunts and multipliers? Derive expressions to find the required values of shunts and multipliers. **(06 Marks)**

b. What are Instrument Transformers? Differentiate between Current Transformers and Power Transformers. **(06 Marks)**

c. Explain the current transformer with the help of an equivalent circuit diagram and a phasor diagram, write expressions for 'ratio error' and 'phase angle error' of a CT. **(08 Marks)**

OR

6 a. Explain what is meant by testing of Instrument Transformers, with a neat circuit diagram explain silsbee's method of testing CT. **(06 Marks)**

b. State the advantages and disadvantages of using Instrument transformers. **(06 Marks)**

c. Describe experimental method of measurement of flux density in a Ring specimen of magnetic material using ballistic galvanometer. **(08 Marks)**

Module-4

7 a. What are the advantages of electronic instruments? **(04 Marks)**

b. Explain the construction and working principle of a true RMS Reading Voltmeter. **(08 Marks)**

c. Explain the construction and working of a RAMP type digital voltmeter. **(08 Marks)**

OR

8 a. Explain, what are Q meters? **(04 Marks)**

b. Explain the construction and working of a successive approximation type DVM. **(08 Marks)**

c. Explain the principle and working of an electronic energy meter with a block diagram. What are the advantages of electronic energy meters over conventional Electromechanical Energy Meters? **(08 Marks)**

Module-5

9 a. Explain with suitable sketch, working of a Cathode Ray Tube (CRT). **(06 Marks)**

b. Explain the principle and operation of (i) Strip chart recorders (ii) Galvanometer recorders. **(08 Marks)**

c. Write a note on Display Devices. **(06 Marks)**

OR

10 a. Explain with a neat sketch ECG recorders? **(08 Marks)**

b. Write notes on: i) LEDs ii) LCDs. **(06 Marks)**

c. Explain what are: i) Nixes ii) Liquid Vapour Devices. **(06 Marks)**

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CBCS SCHEME

18CPC39

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Question Paper Version : D

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Constitution of India and Professional Ethics and Cyber Law
(COMMON TO ALL BRANCHES)

Time: 2 hrs.] [Max. Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the Hundred questions, each question carries **ONE mark**.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

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1. Which is the landmark Judgment passed by the Supreme Court in respect to Preamble of Constitution
   a) Beur beri b) Keshavananda Bharathi
   c) Menaka Gandhi d) Sonia Gandhi

2. Who is the neutral person in the affairs of party politics
   a) C.M b) Home Minister c) Finance Minister d) Speaker

3. Indian Constitution guarantees reservation of seats to SC & ST in
   a) Lok Sabha and Assembly b) Lok Sabha only
   c) Lok Sabha and Rajya Sabha d) Rajya Sabha

4. Who will preside over the joint session of both the houses of the Parliament
   a) President b) Prime Minister c) Speaker d) Law Minister

5. What is the minimum age for becoming M.P in Rajya Sabha and Lok Sabha
   a) 18 and 25 b) 25 and 18 c) 25 and 30 d) 30 and 25

6. India is referred to as _______ under the Indian Constitution
   a) Country b) Hindustan c) India d) Bharat

7. The citizens can enforce their Fundamental Rights before SC under
   a) Article 31 b) Article 32 c) Article 33 d) Article 34

8. Who quoted "Child of Today is Citizen of Tomorrow"?
a) L. Tilak b) Jawaharlal Nehru c) B.R. Ambedkar d) Gandhiji

9. What is the minimum age required for casting of Vote
a) 18 b) 19 c) 20 d) 21

10. Who quoted "Freedom is my birth right"?
a) L. Tilak b) Jawaharlal Nehru c) Sardar Patel d) Gandhiji

11. One of the salient features of our constitution in
a) It is fully rigid
b) It is fully flexible
c) It is partly rigid and partly flexible
d) None of these

12. A person to be appointed as a Governor of a State must have completed the age of
a) 30 years b) 35 years c) 45 years d) 50 years

13. The Chief Election Commission holds office for a period of
a) 3 years
b) 6 years
c) 5 years
d) 6 years or till he attains age of 65 years

14. The procedure for amending the constitution is detailed under
a) Article 360 b) Article 368 c) Article 352 d) Article 301

15. Writ of Mandamus can be issued on the ground of
a) Non – performance of public duties
b) Unlawful Detention
c) Unlawful occupation of public office
d) None of these

16. Who acted as the Chairman of the drafting committee of the Constitution of India?
a) Dr. B.R. Ambedkar
b) B.C. Rajgopalanchari
c) Dr. Rajendra Prasad
d) Jawaharlal Nehru

17. Engineering Ethics is
a) A macro Ethics
b) Business Ethics
c) A developing Ethics
d) A code of Scientific rules based on Ethics

18. The use of intellectual property of others without permission or credit is referred as
a) Cooking b) Stealing c) Plagiarism d) Trimming.

19. Who is the chair person of Parliament
a) CM b) PM c) FM d) Speaker

20. Who will impeach the Chief Justice of India
a) Supreme Court
b) Law Minister
c) 2/3rd Majority of Parliament
d) By Rajya Sabha

21. The Chief Justice of High – Court is appointed by
a) President b) Chief Minister c) Prime Minister d) Governor

22. Which is Not a Fundamental right
a) Right to freedom
b) Right to Constitutional remedy
c) Right to property
d) Right to equality

23. The tenure of Vice – President
a) 2 years b) 5 years c) 3 years d) 1 year

24. How many Schedules are there in Indian Constitution?
a) 7 b) 5 c) 12 d) 6

25. The membership of Legislative Assembly of State varies between
a) 60 & 500 b) 100 & 300 c) 150 & 450 d) 100 & 400

26. According to Indian Constitution, the power of amending the Constitution is vested with
a) Parliament b) President
c) People d) The Prime Minister of India

27. Engineers can use code of ethics as guidelines to
a) Resolve the conflicts b) Formulate the problem
c) Shift of Responsibility d) Overcome the work pressure

28. What is the maximum strength of Lok Sabha
a) 500 b) 545 c) 552 d) 550

29. Union list has
a) 95 subjects b) 97 subjects c) 105 subjects d) 66 subjects

30. The Fundamental Rights of Indian citizen are contained in
a) Part – III of Constitution b) Part – IV of Constitution
c) The 7th Schedule of Constitution d) None of these

31. Uniform Civil code means
a) A code related to individuals public life b) A code meant for Hindu only
c) A Civil procedure code
d) A Codified Law applicable to all person of India irrespective of their religion

32. The Vice – President has power
a) To sign bills passed by Rajya Sabha b) To preside over Rajya Sabha
c) To nominate two members for Rajya Sabha d) To propagate ordinance

33. Parliament of India consists of
a) Lok Sabha b) Lok Sabha & Rajya Sabha
c) Only Rajya Sabha d) None of these

34. A National emergency can remain in operation with the approval of Parliament for
a) An indefinite period b) A maximum period of 6 months
c) A maximum period of 1 year d) A maximum period of 3 years

35. In Engineering research and testing, retaining the contradictory statement, discarding the rest is called
a) Trimming b) Scanning c) Cooking d) Skimming

36. The Chief Justice and other Judges of High Court are appointed by
a) President b) Chief Minister c) Prime Minister d) Governor

37. The terms 'Ethics' is derived from
a) Ethical in English b) Ethic in Latin c) Custom d) Ethicos in Greek

38. The aim of the Directive Principles of State Policy is to establish
a) Capitalist State in Our Country b) Communist State in Our Country
c) Welfare State in the Country d) All of these

39. Special majority means more than
a) 50% majority b) Two – third majority c) 75% majority d) 60 - majority

40. One way of misusing the truth is
a) Exaggerating the truth b) Making wrong statement
c) Making confused statement d) Failure to seek out the truth

41. Salaries and other emoluments of the High Court Judges shall be determined by the
a) Governor b) Parliament c) Chief Minister d) State Legislature

42. According to 74th Amendment Act of 1993, which subject has been incorporated?
a) Municipalities b) Co-operative Society
c) Gram Panchayat d) Taluk Panchayat

43. IP Sec is designed to withstand replay attacks through the use of
a) Sequence numbers b) Nonces
c) Nonces + Sequence numbers d) Timestamps

44. The Key Confirmation Key [KCK] is used to
a) Integrity – protect data between the station and the AP
b) Integrity – protect messages in the four – way hand shake
c) Encrypt data between the station and the AP
d) Encrypt the message containing the group key.

45. Which of the following is true in a Smurf Attack?
a) The Victim receives large number of UDP packers to non – listening ports
b) The Victim receives large number of TCP SYN – ACK packers
c) The Victim receives large number of ICMP "Echo Request" messages
d) The Victim receives large number of ICMP "Echo Reply" messages.

46. A persistent cross – site scripting attack saves malicious code on
a) The client b) The server c) Both client & server d) Neither (a) & (b)

47. The possible goal of an attacker is sending packets with invalid combinations of TCP header flag is to
a) Launch a SYN flood attack b) Find which services are open
c) Perform OS finger printing
d) Determine the addressing schema within an organisation

48. The SOAP binding refers to
a) The object bound to a SOAP message b) The XML schema of a SOAP message
c) The mapping between a SOAP message underlying transport protocol
d) The headers in a SOAP message

49. The EKE protocol is resistant to
a) Replay attacks
b) Man – in – the middle attacks
c) Dictionary attacks
d) Reflection attacks

50. The SIM authenticates itself to the MSC/HLR using
a) A user password
b) A digital certificate
c) A response to a challenge
d) An encrypted signaling message.

51. When the Indian Constitution enacted and adopted?
a) 26/10/1949 b) 26/12/1949 c) 26/11/1949 d) 26/01/1949

52. When the Indian Constitution gives effect
a) 26/10/1949 b) 26/12/1949 c) 26/01/1950 d) 26/01/1949

53. Which of the following word was added in the Preamble of the Constitution by 42nd Amendment Act 1976
a) Socialist b) Sovereign c) Federal d) Republic

54. The President power to suspend death sentence temporarily is called
a) Respite b) Reprieve c) Remission d) Constitution

55. The Preamble of the Constitution has been amended so far
a) 4 times b) 3 times c) twice d) Once

56. Who are not entitled to form Union
a) Students b) Police c) Teachers d) Entrepreneurs

57. Which is not a Fundamental Right
a) Right against exploitation
b) Right to freedom of religion
c) Right to strike
d) Right to equality

58. Which of the following is not one of the 3 organs of state / Union
a) Executive b) Press c) Judiciary d) Legislation

59. How many Anglo Indians and others can be nominated by the President to the Lok Sabha and Rajyasabha
a) 2 & 12 b) 2 & 10 c) 1 & 12 d) 1 & 10

60. Which state Constitution has removed by the Parliament of India?
a) West Bengal b) Nagaland c) Sikkim d) Jammu & Kashmir

61. When the office of the President falls vacant , the same must be filled up within
a) 4 months b) 6 months c) 12 months d) 18 months

62. The Preamble of the Constitution indicates
a) Power to make laws
b) The sovereign of Indian Constitution
c) Power of Parliament to amend the Constitution
d) Sources of Constitution.

63. Which important human right is protected under Article 21
a) Right to Equality
b) Right to life and liberty
c) Right to freedom of speech
d) Right to religion

64. Right to Equality is guaranteed under Article
a) 13 b) 15 c) 16 d) 14

65. No person shall be punished for same offence more than once
a) Jeopardy
b) Double Jeopardy
c) Ex-post facto law
d) Testimonial compulsion

66. The Rajya Sabha
a) Is a Permanent House
b) Has a life of 6 years
c) Has a life of 5 years
d) Has a life of 7 years

67. The Quorum or minimum number of members required to hold the meetings of either houses of the Parliament is
a) One - tenth b) One - fifth c) One - third d) One - fourth

68. The Advice of Supreme Court is
a) Binding on the President
b) Not binding on the President
c) Binding on the President if it is tendered unanimously
d) None of these

69. Article 19 provides
a) 6 freedoms b) 7 freedoms c) 8 freedoms d) 5 freedoms

70. Who is the present speaker of Lok Sabha
a) Sumithra Mahajan b) K.S Hegde c) Om Birla d) Venkiah Naidu

71. Who appoints Lieutenant Governor General to Delhi
a) PM b) Law Minister c) President d) Vice - President

72. Who acts as a President when neither the President not the Vice – President is available
a) Speaker of Lok Sabha
b) Attorney General of India
c) Chief Justice of India
d) Speaker of Rajya Sabha

73. How many judges are there in the SC including Chief Justice of India?
a) 15 b) 19 c) 25 d) 31

74. The Parliamentary system of the Indian Constitution is borrowed from
a) Britain Constitution
b) Objective Constitution
c) Canada Constitution
d) Australian Constitution

75. The final interpreter to the Indian Constitution is
a) Speaker of LS b) Parliament c) President d) Supreme Court

76. The person arrested has to be produced before Magistrate within
a) 1 week b) 24 hours c) 72 hours d) 2 months

77. Which is the language to be used in Parliament
a) Kannada b) Hindi c) English d) Both (b) & (c)

78. President made Proclamation of emergency on the grounds of internal disturbance for first time in
a) 1975 b) 1965 c) 1962 d) 1950

79. Who will impeach Chief Election Commissioner of India
a) President b) Vice President
c) Prime Minister d) By 2/3rd majority of Parliament

80. Which is the highest Court of the Country
a) High Court b) Supreme Court c) District Court d) CET

81. India has
a) Democracy b) Presidental system
c) Direct Democracy d) Parliamentary Democracy

82. What is the punishment given , if computer source documents are tampared
a) Imprisonment of 2 years with fine of Rs 2 lakhs
b) Imprisonment of 3 years with fine of Rs 2 lakhs
c) Imprisonment of 4 years with fine of Rs 2 lakhs
d) Imprisonment of 5 years with fine of Rs 2 lakhs

83. What is the punishment given , if computer has been hacked under Section 43
a) Imprisonment of 1 year with fine upto Rs 2 lakhs
b) Imprisonment of 3 years with fine upto Rs 5 lakhs
c) Imprisonment of 3 years with fine upto Rs 4 lakhs
d) Imprisonment of 4 years with fine upto Rs 5 lakhs

84. Who appoints Prime Minister
a) The President of India b) Lok Sabha
c) The majority party is Lok Sabha d) Rajya Sabha

85. How much time was taken for framing Constitution?
a) 2 years 11 months and 18 days b) 13 years 11 months and 18 days
c) 4 years 11 months and 18 days d) 1 year 11 months and 18 days

86. The President of India is
a) The real ruler of India b) Head of the Government
c) Constitution Head of Country d) Head of the State

87. Which of the State has highest members in Lok Sabha
a) Andra Pradesh b) Uttar Pradesh c) Madhya Pradesh d) Karnataka

88. The Council of Ministers and Prime Minister shall not exceed total strength of the LokSabha
a) 5 % b) 10 % c) 12 % d) 15 %

89. The total number of seats in Legislative Assembly of Karnataka is
a) 200 b) 224 c) 240 d) 250

90. The basic feature of the Indian Constitution is found in
a) Fundamental duties
b) Fundamental Rights
c) Preamble
d) Directive Principle of State Policy

91. To became a Judge of High Court, one must be practicing Advocate of High Court for a period of atleast _____ years
a) 20
b) 10
c) 15
d) 5

92. The Constitution empowers State Government to make Special Law for
a) Workers
b) Teachers
c) Women & Children
d) Farmers

93. Directive principles come under _____ of the Constitution
a) Part - II
b) Part - III
c) Part - IV
d) Part – I

94. The system of Legislature in the State of Karnataka is
a) Bicameral
b) Unicameral
c) Cameral
d) Multi cameral

95. The Mandal Commission, was Constituted relating to
a) Reservation of SCs
b) Reservation to STs
c) Reservation
d) Reservation to Backward classes

96. Who is appointing Chief Election Commissioner?
a) Prime Minister
b) Law Minister
c) President
d) Vice - President

97. Who is the Ex – Officio Chairman of Rajya Sabha?
a) President
b) Vice - President
c) Prime Minister
d) Governor

98. Vice – President of India is elected
a) By the people
b) By the members of State Legislature Assembly
c) By the members of Rajya Sabha
d) By the members of both the houses of Parliament at a joint sitting.

99. Which Amendment deals with the establishment of Municipalities a part of Constitution system?
a) 44^{th}
b) 74^{th}
c) 76^{th}
d) 86^{th}

100. Who appoints the Governor of the State?
a) Chief Justice of India
b) Chief Justice of State
c) Chief Minister
d) President

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CBCS SCHEME

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18MATDIP31

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Additional Mathematics – I

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Express the following complex number in the form of $x+iy$: $\frac{(1+i)(1+3i)}{1+5i}$. **(06 Marks)**

b. Prove that $\left(\frac{\cos\theta+i\sin\theta}{\sin\theta+i\cos\theta}\right)^4 = \cos 8\theta + i\sin 8\theta$. **(07 Marks)**

c. If $\vec{a}=(3,-1,4)$, $\vec{b}=(1,2,3)$ and $\vec{c}=(4,2,-1)$, find $\vec{a}\times\left(\vec{b}\times\vec{c}\right)$. **(07 Marks)**

OR

2 a. Find the angle between the vectors, $\vec{a}=5\hat{i}-\hat{j}+\hat{k}$ and $\vec{b}=2\hat{i}-3\hat{j}+6\hat{k}$. **(06 Marks)**

b. Prove that $\left[\vec{a}\times\vec{b}, \vec{b}\times\vec{c}, \vec{c}\times\vec{a}\right] = \left[\vec{a},\vec{b},\vec{c}\right]^2$ **(07 Marks)**

c. Find the fourth roots of $-1+i\sqrt{3}$ and represent them on the argand diagram. **(07 Marks)**

Module-2

3 a. Obtain the Maclaurin's expansion of $\log_e(1+x)$. **(06 Marks)**

b. If $u=\sin^{-1}\left[\frac{x^3+y^3}{x+y}\right]$, prove that $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=2\tan u$. **(07 Marks)**

c. If $u=x(1-y)$, $v=xy$, find $\frac{\partial(u,v)}{\partial(x,y)}$. **(07 Marks)**

OR

4 a. Obtain the Maclauvin's series expansion of the function $\log_e \sec x$. **(06 Marks)**

b. If $u=x^2-2y$; $v=x+y$ find $\frac{\partial(u,v)}{\partial(x,y)}$. **(07 Marks)**

c. If $u=f(x-y, y-z, z-x)$, prove that $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}=0$. **(07 Marks)**

Module-3

5 a. Find the velocity and acceleration of a particle moves along the curve, $\vec{r}=e^{-2t}\hat{i}+2\cos 5t\hat{j}+5\sin 2t\hat{k}$ at any time t. **(06 Marks)**

b. Find div $\vec{F}$ and curl $\vec{F}$, where $\vec{F}=\nabla\left(x^3+y^3+z^3-3xyz\right)$. **(07 Marks)**

c. Show that $\vec{F}=(2xy+z^2)\hat{i}+\left(x^2+2yz\right)\hat{j}+\left(y^2+2xz\right)\hat{k}$ is conservative force field and find the scalar potential. **(07 Marks)**

OR

6 a. Show that the vector field, $\vec{F} = (3x + 3y + 4z)\hat{i} + (x - 2y + 3z)\hat{j} + (3x + 2y - z)\hat{k}$ is solenoidal. **(06 Marks)**

b. Find the directional derivative of $\phi = \dfrac{xz}{x^2 + y^2}$ at (1, −1, 1) in the direction of $\vec{A} = \hat{i} - 2\hat{j} + \hat{k}$. **(07 Marks)**

c. Find the constant 'a' such that the vector field $\vec{F} = 2xy^2z^2\hat{i} + 2x^2yz^2\hat{j} + ax^2y^2z\hat{k}$ is irrotational. **(07 Marks)**

Module-4

7 a. Find the reduction formula for $\int_0^{\frac{\pi}{2}} \sin^n x dx$. **(06 Marks)**

b. Evaluate $\int_0^1 \int_0^3 x^3y^3 dxdy$. **(07 Marks)**

c. Evaluate $\int_0^3 \int_0^2 \int_0^1 (x + y + z) dzdxdy$. **(07 Marks)**

OR

8 a. Evaluate : $\int_0^{\frac{\pi}{6}} \sin^6(3x) dx$. **(06 Marks)**

b. Evaluate : $\int_0^1 \int_x^{\sqrt{x}} xy\, dydx$. **(07 Marks)**

c. Evaluate : $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} xyz dzdydx$. **(07 Marks)**

Module-5

9 a. Solve : $\dfrac{dy}{dx} + y\cot x = \sin x$. **(06 Marks)**

b. Solve : $(2x^3 - xy^2 - 2y + 3)dx - (x^2y + 2x)dy = 0$. **(07 Marks)**

c. Solve : $3x(x + y^2)dy + (x^3 - 3xy - 2y^3)dx = 0$. **(07 Marks)**

OR

10 a. Solve : $(5x^4 + 3x^2y^2 - 2xy^3)dx + (2x^3y - 3x^2y^2 - 5y^4)dy = 0$. **(06 Marks)**

b. Solve : $\dfrac{dy}{dx} + x\sin 2y = x^3\cos^2 y$. **(07 Marks)**

c. Solve : $[1 + (x + y)\tan y]\dfrac{dy}{dx} + 1 = 0$. **(07 Marks)**

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