Code No. 5084 / S

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) II-Semester (Supplementary) Examination, January 2016

Subject : Strength of Materials – II

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 What is an elastic prop? 2

2 Define 'Resilence' and 'Proof Resilence'. 2

3 Differentiate between 'Laminated spring's' and 'coiled springs'. 2

4 Write Perry's formula for a long column subjected to an eccentric load. 2

5 What is the relation between number of members and joints in a space truss? 2

6 What is a conjugate beam? Explain how the shear force of conjugate beam is related to real beam. 3

7 A cantilever beam of span 'ℓ' is subjected to a clockwise couple 'M' at a distance $\ell/4$ from free end. Calculate the maximum deflection, using 'Moment area method'. 3

8 A fixed beam of span 6m is subjected to a point load of 40 kN at 2m from left support. Determine the fixed end moments for the beam. 3

9 Define shear centre. 3

10 State the assumption made in Euler's theory and limitation of Euler's theory. 3

PART – B (50 Marks)

11 Determine the deflection under 16kN and 20kN loads acting on the beam shown in fig.1 EI = 30,000 KN-m^2.

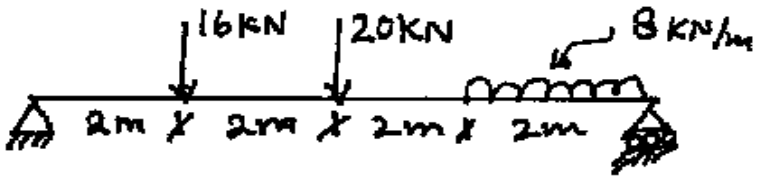

Fig 1

12 Find the deflection at the free end of the cantilever beam shown in fig.2, by conjugate beam method. E = 200 GPa. I = 2 x 10^8 mm^4.

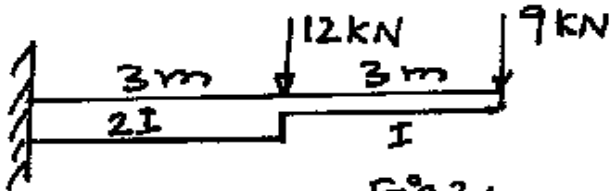

Fig 2

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13 Analyse the continuous beam shown in fig. 3 by “Three moments equation”. Sketch SFD and B.M.D.

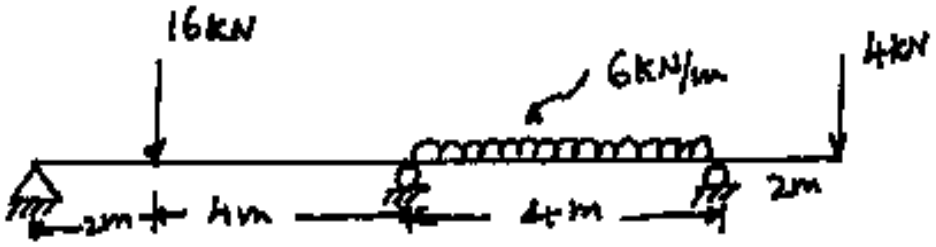

Fig 3

14 A point in an elastic body is subjected to stresses of 60 MPa (tensile) and 40 MPa (compressive) in two mutually perpendicular directions. If the maximum principal stress is limited to 65 MPa, calculate i) Shear stress on the planes ii) Minor principal stress iii) Maximum shear stress.

15 A hollow circular shaft has to transmit 240 kW at 120 r.p.m. with an allowable shear stress of 60 MPa. Calculate the minimum external diameter of the shaft required if the torque transmitted in each revolution exceeds the mean by 30%, and diameter ratio is 0.7.

16 A bar of length 4m is used as a simply supported beam and it is subjected to an udl of 24 kN/m over the entire span due to which it deflects by 12mm at the centre. If the same bar is used as a column with i) Both ends hinged ii) Both ends fixed, Calculate Euler’s crippling load.

17 A closely coiled helical spring is subjected to an axial load of 0.4 kN. The mean coil diameter is 10 times of wire diameter. If the permissible shear stress is 80 MPa, calculate the diameter of wire, coil and stiffness of spring .Take C = 80 GPa.

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Code No. 5090 / S

FACULTY OF ENGINEERING

B.E. 2/4 (EE/Inst.) II - Semester (Suppl.) Examination, January 2016

Subject : Solid Mechanics

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Define volumetric strain. (2)
2 Give the relationship between elastic constants. (3)
3 Define shear force and bending moments. (3)
4 Define flexural rigidity. (2)
5 What is the section modulus for a circular section? (3)
6 Draw the stress distribution for 'T' section. (2)
7 A cantilever of length 'l' is carrying a udl of w per unit run over the whole span. What is the deflection at free end? (3)
8 Define resilience and proof resilience. (3)
9 Define Torsional Rigidity. (2)
10 Differentiate closed coiled helical spring and open coiled helical spring. (2)

PART – B (50 Marks)

11 Two steel rods, one of 80 mm diameter and the other 60 mm, are joined end to end by means of a turn buckle. The other end of each rod is rigidly fixed and there is initially a small tension in the rods. If effective length of each rod is 4.5m. Find the increase in this tension when the turn buckle is turned by one quarter of a turn. On one end of the bigger diameter rod there are 0.15 threads per mm length. While there are 0.2 threads per mm length on the other rod. Neglect the extension of the turn buckle. Find also what rise in temperature would nullify the increase in tension. Take E = 200 GN /m^2 and $\alpha = 12 \times 10^{-6}$ per ^oC. (10)

12 Draw the shear force and bending moment diagrams for the beam shown in figure 1. (10)

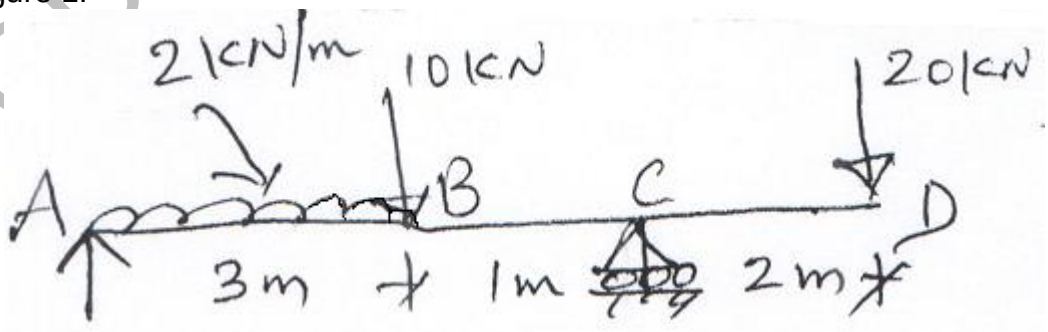

Figure 1

13 An I-section beam 360 mm x 250 mm has a web thickness of 15 mm and flange thickness of 20 mm. It carries a shearing force of 120 kN. Sketch the shear stress distribution across the section. (10)

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14 Determine the deflection of the beam under the two loads and also maximum deflection. (10)

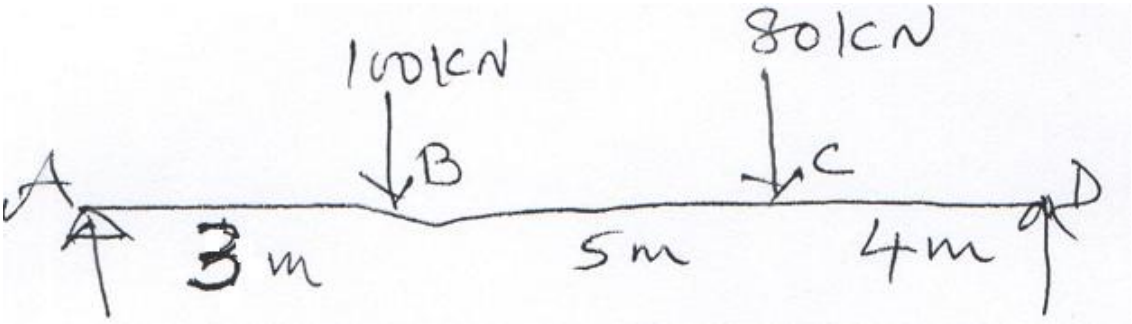

Figure 2

Note: Take flexural rigidity as 'EI'.

15 An unknown weight fall from a height of 15 mm on a collar rigidity attached to the lower end of a vertical bar 5m long and 700 mm^2 in section. If the maximum extension of a rod is to be 2mm, what is the corresponding stress and magnitude of the unknown weight? Take E = 200 GN/m^2. (10)

16 A solid alloy shaft 50 mm diameter is to be coupled in series with a hollow steel shaft of the same external diameter . If the angle of twist per unit length of the steel shaft is to be 70 percent of that of the alloy shaft, find the internal diameter of the steel shaft. Also find the speed at which the shafts should be driven to transmit 20 kW, if allowable shearing stress in alloy and steel are 56 MN/m^2 and 80 MN/m^2 respectively. Take C_{steel} = 2.25 C alloy. (10)

17 A weight of 200 N is dropped on to a helical spring made of 15 mm wire closely coiled to a mean diameter of 120 mm with 20 coils. Determine the height of drop if the instantaneous compression is 80 mm. Take C = 85 GN/m^2. (10)

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Code No. 5099 / S

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) II – Semester (Suppl.) Examination, January 2016

Subject : Analog Electronic Circuits

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 State the advantages of class-C power amplifier over class-B tuned power amplifier. 2
2 What is heat sink? What is its function? 2
3 Distinguish between crossover distortion and non-linear distortion. How they can be eliminated? 3
4 A 3-stage double tuned amplifier system is to have a half power bandwidth of 30 KHz centered on a center frequency of 400 KHz. Assuming that all stages are identical, determine the half power BW of single stage. Assume that each stage couple to get maximum flatness. 3
5 Give the significance of two capacitors in hybrid-π model, giving their typical values. 2
6 Explain the effect of negative feedback on gain stability. 2
7 Explain the main difference an amplifier and an oscillator. 2
8 In a transistorized Hartley oscillator, the two inductomces are 2mH and 25 μH while the frequency to be changed from 950 KHz to 2050KHz. Calculate the range over which the capacitor is to be varied? 3
9 Explain the selection of configuration for multistage amplifier? 3
10 Explain Nyquist criterion. 3

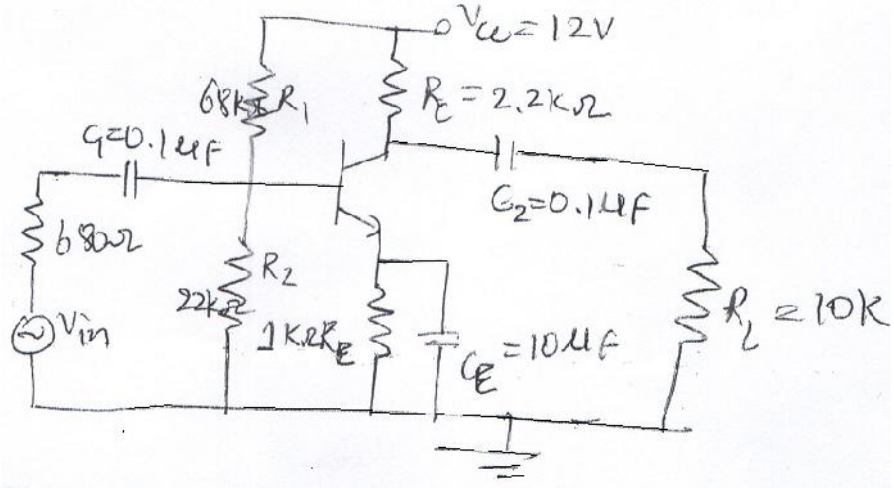
PART – B (50 Marks)

11 a) A power amplifier supplies 4 watts for 8 ohm load. The zero-signal dc collector current is 35mA and it risks to 40 mA when the signal is applied. Determine the percent of second harmonic distortion. 4

b) Show that in case of transformer coupled class-A power amplifier, maximum theoretical efficiency is 50%. 6

12 Show that the minimum forward gain should be 44.54 for providing sustained oscillations in RC.phase-shift oscillator. 10

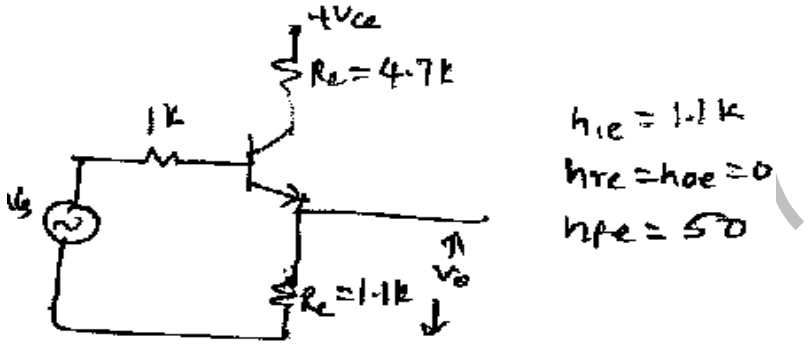
13 a) Compare various cascading methods. 4
b) Determine the low frequency response of the amplifier circuit shown in fig.1. 6



14 Draw the schematic of a two transistor class-B pushpull amplifier and show that $P_{c\max} = 4/®^2$ P_{acmax} . 10

15 a) Explain the block diagram of a feedback amplifier and explain each block. 4

b) Determine A_{vf}, A_{IF}, Z_{of}, Z_{if} for the given circuit. 6



16 a) Sketch the frequency response of a stagger tuned amplifier. State its advantages over cascaded single tuned amplifier. 3

b) What are the methods of classification of tuned amplifier? 3

c) A single tuned amplifier using FET has tank circuit components L = 100μH, R = 5Ω, C = 1000 PF the FET used has rd = 500 kΩ cmd gm = 5mv 4

Find i) Resonant frequency
ii) Tank circuit impedance at resonance
iii) Voltage gain at resonance
iv) Bandwidth

17 a) Get the following hybrid-π conductances in terms of h-parameters. 4

i) Transistor conductance, g_m
ii) Feedback conductance, gb'c

b) What factors decide the amplitude and frequency stability of an oscillator. 6

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Code No. 5107 / S

FACULTY OF ENGINEERING

B.E. 2/4 (M / P) II – Semester (Suppl.) Examination, January 2016

Subject : Fluid Dynamics

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 What do you mean by velocity gradient? How is the shear stress at a point in a fluid body dependent on the velocity gradient at that point?

2 Differentiate between local acceleration and convective acceleration.

3 Determine the mass density, specific volume and specific weight of a liquid whose specific gravity is 0.85.

4 Differentiate between energy and energy head.

5 Sketch the distribution of velocity and shear stress across the flow in a pipe of circular section and write the corresponding equations.

6 Differentiate between hydro-dynamically smooth and rough pipes.

7 Distinguish between pressure drag and the friction drag.

8 A plate is placed at zero angle of incidence in a fluid approach velocity 'V'. The thickness of boundary layer 2.5m from the leading edge is 0.15 cm. Find the thickness of boundary layer at a distance of 4 m from the leading edge.

9 Define Mach number and write its significance.

10 Obtain an expression in differential form for continuity equation for one dimensional compressible flow.

PART – B (50 Marks)

11 a) A 2D steady flow is given by the stream function $\Psi = 2xy$. Determine the velocity at a point P (1, 4) in the field. Find out the value of velocity potential function passing through the point 'P'. 5

b) Define the terms i) velocity potential ii) stream function. Show that the stream lines and equipotential lines form a net of mutually perpendicular lines. 5

12 a) Derive Bernoulli's equation of motion with assumptions, also discuss about its limitations. 5

b) A pipe bend tapers from 500 mm at the inlet to a diameter of 250 mm at outlet and turns through a 45^o in the horizontal plane. The pressure at inlet is 40 kPa. If the pipe is conveying oil of specific gravity 0.85, find the magnitude and direction of the resultant force on the bend when the oil flow rate is 450 lps. 5

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13 a) Derive and explain Darcy-Weisbach equation. 5

b) An oil of specific gravity 0.85 and viscosity 0.75 N.s/m^2 flows through a horizontal pipe of diameter 60 mm. If between two sections 150 m apart, the pressure drop is 2750 kPa. Find 5

i) Discharge in the pipe
ii) Maximum velocity
iii) Velocity gradient close the pipe wall
iv) Frictional resistance for the 150 m length of pipe. 5

14 a) Explain the characteristics of laminar and turbulent boundary layer over a flat plate. 5

b) A truck having a projected area of 6.5 m^2 travelling at 70 KMPH has a total resistance of 1960 N, of this 20% is due to rolling friction and 10% is due to surface friction. The rest is due to form drag. Calculate the coefficient of form drag. Take density of air as 1.25 kg/m^3. 5

15 a) Derive the energy equation for adiabatic flows. 5

b) A gas with a velocity of 300 m/s is flowing through a horizontal pipe at a section where pressure is 78 kN/m^2 absolute and temperature 40^0C. The pipe changes in diameter and at this section, the pressure is 117 kN/m^2 absolute. Find the velocity of a gas at this section, if the flow of the gas is adiabatic. Take R = 287 J/kg ^{0}K and k = 1.4. 5

16 a) Derive continuity equation for a flowing fluid in three dimensional flow field. 5

b) Explain the working of micro-manometer with the aid of neat sketch. 5

17 Write short notes on the following : 4 x 2. ½ = 10

a) Newtonian and Non-Newtonian fluids
b) Reynolds experiment
c) Different types of Drag
d) Mach Cone

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Code No. 5109 / S

FACULTY OF ENGINEERING

B.E. 2/4 (AE) II-Semester (Supplementary) Examination, January 2016

Subject : Fluid Mechanics and Machinery

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 State and explain Newton's law of viscosity.
2 The pressure intensity at a point in a fluid is given 3.924 N/CM^2. Find corresponding height of fluid when the fluid is a) water, b) oil of Sp.gr.0.9.
3 Distinguish between : A) steady and un-steady flow b) Laminor and Turbulant flow.
4 State and express momentum equation.
5 What do you mean by viscous flow?
6 What is compound pipe? What will be loss of head when pipes are connected in series?
7 Find the force exerted by a jet of water of diameter 75mm on a stationary flat plate, when its jet strikes the plate normally with velocity of 20 m/s.
8 How will you classify the Turbines?.
9 Define specific speed of a centrifugal pump and give expression for it.
10 Define slip, percentage of slip and co-efficient of discharge of a reciprocating pump.

PART – B (50 Marks)

11 a) Differentiate dynamic viscosity and kinematic viscosity.
b) Determine the intersity of shear of an oil having viscosity = 1.2 poise and is used for lubricating in the clearance between a 10cm diameter shaft and its journal bearing. The clearance is 1.0mm and shaft rotates at 200 r.p.m.

12 a) Define the terms :
i) Velocity potential function
ii) Stream function
b) A 25 cm diameter pipe carries oil of SP.gr.0.9 at a velocity of 3 m/s. At another section the diameter is 20cm. Find the velocity at this section and also mass rate of flow of oil.

13 A fluid viscosity 0.7 NS/m^2 and SP.gr.1.3 is flowing through a circular pipe of diameter 100mm. The maximum shear stress at the pipe wall is given as 196.2 N/m^2, find i) the pressure gradient ii) the average velocity, iii) renolds number of the flow.

14 a) Define and explain the terms :
i) Hydraulic Gradient Line (H.G.L.) and ii) Total Energy Line (T.E.L.)
b) An oil of kinematic viscosity 0.5 stoke is flowing through a pipe of diameter 300mm at the rate of 320 litres per sec. Find the head lost due to friction for a length of 60 m of the pipe.

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15 A Kaplan turbine of runner diameter 4.5m is running at 40 r.p.m. The guid blade angle at inlet is 145^0 and runner blade angle at outlet is 25^0 to the direction of vane. The axial flow area of water through runner is $25m^2$. If the runner blade angle at intlet is radial determine i) Hydraulic efficiency ii) Discharge through turbine iii) Power developed by the turbine, iv) specific speed of turbine.

16 A centrifugal pump having outer diameter equal to two times of inner diameter and running at 1000 rpm. Work against a total head of 40m. The velocity of flow through the impeller is constant and equal to 2.5 m/s. the vanes are set back at an angle of 40^o at outlet. If the outer diameter if the impeller is 500mm and width at outlet is 50mm, determine :
i) Vane angle at outlet ii) Work done by impeller on water per second, and ii) Manometric efficiency

17 a) What is an air vessel? Describe the function of the air vessel for reciprocating pumps.
b) A single-acting reciprocating pump running at 30 rpm delivers 0.012 m^3/s of water. The diameter of the piston is 25cm and stroke length is 50cm. Determine, i) The theoritical discharge of the pump, ii) co-efficient of discharge and iii) slip.

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Code No. 5111 / S

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) II-Semester (Supplementary) Examination, January 2016

Subject : OOPS Using Java

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1		What is an object and class in Java? Give an example for each.	3
2		What are the steps involved in creating an object?	3
3		Differentiate between throw and throws keyword. Give an example.	3
4		What is the difference in comparable and comparator interface?	3
5		What do you mean by multithreaded program?	2
6		List out the differences between window and a frame.	3
7		What is serialization and deserialization?	2
8		When a thread is created and started, what is its initial state?	2
9		Define applet and list its life cycle.	2
10		What is the use of FILE class?	2

PART – B (50 Marks)

11	a)	What do you mean by short-circuit logical operators? Why is it required? Explain with an example.	5
	b)	Why the usage of "this" keyword is redundant? Explain with an example. Inspite of redundancy "this" is also useful in other context, explain with an example.	5
12	a)	Why Java has two days to create child threads and which approach is better. Write a program to demonstrate extending a thread class.	5
	b)	Write a program for reading characters from a buffered reader.	5
13	a)	Write a program for converting an array list to an array. Mention the reasons for converting collections to an array.	5
	b)	Explain about string Tokenizer with a program.	5
14	a)	How can the applet itself cause its window to be updated when its information changes?	5
	b)	Explain adapter class and its usage with a program.	5
15	a)	What is the use of Filename filter? What are the methods included. Write a program to display "html" files using filename filter.	5
	b)	Why buffered byte steams are used? Explain with an example (buffered input stream).	5
16	a)	Write a program to search for a string in another string.	5
	b)	Write a note on access specifiers in Java.	5
17	a)	What is the advantage in using constructor over a method. Give an example.	5
	b)	What is a frame? Write a java program to illustrate the use of frames.	5

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Code No. 5115 / S

FACULTY OF INFORMATICS

B.E. 2/4 (I.T.) II - Semester (Suppl.) Examination, January 2016

Subject : Signals and Systems

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Find the even and odd component of the signal $x(t) = e^{jt}$.

2 Determine whether the following signal is an energy signal or power signal $x(t) = e^{-at}\,u(t)$, $a > 0$.

2 Sketch the following signal x(n) = -u(-n - 1).

4 Given $x(t)=\sin\left(\frac{2®}{3}t\right)$ determine whether the x(t) is periodic or not and if it is periodic determine its fundamental period.

5 Find the Fourier Transform of $x(t) = \delta(t)$.

6 Explain the significance of Region of convergence of Z- Transform.

7 Define impulse response of a system.

8 State the convolution property of Fourier Transform.

9 State the BIBO stability criterion.

10 Find the Z transform of x(n) = u(n).

PART - B (50 Marks)

11 (i) Find the inverse Fourier Transform $X(\mu) = \frac{1}{(a + j\mu)^2}$. (6)

(ii) Determine the complex exponential Fourier series coefficients for the signal $x(t) = cos4t + sin6t$ (4)

12 (i) Determine the Laplace Transform of the signal $x(t) = -e^{-at}\,u(-t)$, a being real and also determine its Region of convergence (ROC). (6)

(ii) State and prove the Final Value theorem of Laplace Transform. (4)

13 (i) Find the ZT of the sequence x(n)=u(n) and plot its ROC (5)

(ii) Find the inverse ZT of $X(z) = \frac{1}{4(z-1)(z-\frac{1}{4})}$, ROC : {|z|>1} (5)

14 (i) State Nyquist Sampling Theorem (3)

(ii) Determine the Nyquist sampling rate and Nyquist sampling interval for the signal $x(t) = 2sinc(100\pi t)$ (7)

..2

15 (i) Solve the second order linear differential equation
$\ddot{y}(t) + 5y(t) + 6\dot{y}(t) = x(t)$ with the initial conditions y(0)=2, y'(0)=1 and $x(t) = e^{-t}u(t)$. (7)

(ii) Check whether the following systems are Linear Time Invariant or not

(a) $y(t) = x\left(\frac{t}{2}\right)$ (b) y(t) = x(t) + x (t-2) for $t \geq 0$. (3)

16 (i) Show that the product of two even signals or of two odd signals is an even signal and that the product of an even and odd signal is an odd signal. (5)

(ii) State and prove Parseval's theorem for Fourier Transform (5)

17 (i) Write the Matlab code for generating an exponential signal $x(t) = 6e^{-at}$ for a duration of 1 second. (5)

(ii) Write the main features of the Matlab programming language. (5)

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