Code No. 3045 / O

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) II-Semester (Old) Examination, November / December 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 Determine polar modulus for a hollow circular section. 2

2 Draw Mohr's circle when the two principal stresses are of the same magnitude, but of opposite sign. 2

3 Determine the reaction of prop when the propped cantilever is subjected to w/m UDL throughout span 'ℓ' m. 2

4 In a closed coiled helical spring subjected to an axial load, if the wire diameter is doubled, keeping other parameter unchanged, the stiffness of the spring when compared to the original one will become. 2
a) twice b) four time c) eight times d) sixteen times

5 Mention any two limitations of Euler's theory of columns. 2

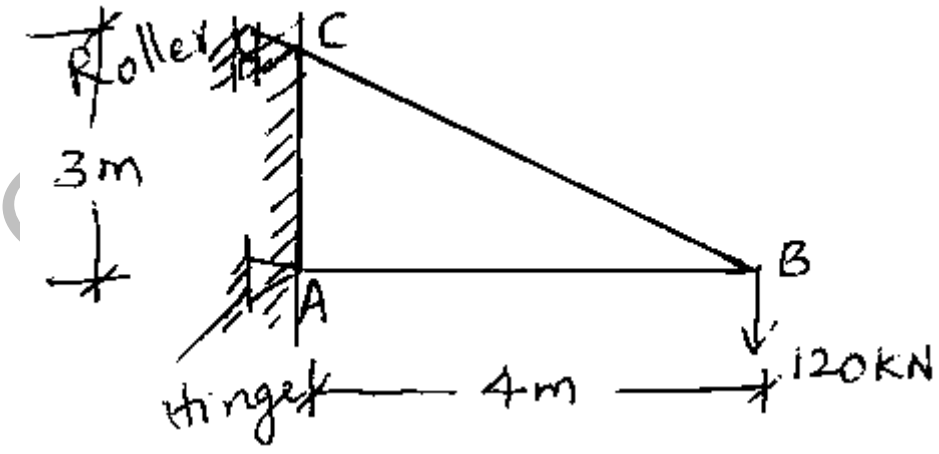
6 Using moment area method, find an expression for the deflection at the free end of a cantilever subjected to vertical load 'w' at the free end. 3

7 State moment area theorems I & II. 3

8 What are the assumptions involved in the torsion equation? 3

9 Calculate the magnitude and direction of fixed end moments at both ends of a fixed beam of 5m span, when the left support sinks down by 10mm. EI = 8 x 10^3 kN-m^2. 3

10 A plane frame has two members AB and BC. Find forces in those members using tension coefficient method. 3



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PART – B (50 Marks)

11 Analyse the propped cantilever beam AB of span 6m, fixed at A and supported at C, 1m from end B by a rigid prop. The beam carries a UDL of 20 kN/m on the left hand half of the span. Sketch SFD and BMD.

12 A beam of uniform rectangular section 200 mm x 300 mm deep is simply supported at the ends. It carries a uniformly distributed load of 9kN/m over the entire length of 5m. If the value of young's modulus is 10000 MPa, find the maximum deflection and the maximum slope.

13 A continuous beam ABC is fixed at A and simply supported at B and C. Point loads 60 kN and 80 kN acts at mid-point of AB and BC. Using the theorem of three moments construct SFD and BMD for the beam. Take AB=4m and BC=6m.

14 State and prove Castigliano's theorem – I.
Using the theorem, determine the central deflection of simply supported beam of span 'ℓ' and carrying a central point load w.

15 At a point within a body subjected to two mutually perpendicular directions, the stresses are 150N/mm^2 (tensile) and 100N/mm^2 (tensile). Each of the above stresses is accompanied by a shear stress of 80N/mm^2. Determine the normal, shear and the resultant stresses on an oblique plane inclined at an angle of 45^0 with the axis of minor tensile stress.

16 a) A hollow shaft is subjected to a torque of 40kNm and bending moment of 30kNm. Calculate the equivalent bending moment and equivalent torsional moment in the shaft.

b) A closely coiled helical spring is subjected to an axial load of 0.4 kN. The mean coil diameter is 10 times of the wire diameter. If the permissible shear stresses is 80 MPa, calculate the diameter of wire and the coil.

17 Determine the Euler's critical load for a hollow cylindrical cast iron column of 150mm external diameter and 20mm thick, if it is 6m long and hinged at its both ends. Compare this load with that given by Rankine's formula. Further for what length of column would these two formulae give the same critical load. Take E = 0.75 x 10^5 N/mm^2, f_c = 540 N/mm^2, and a = 1/1600.

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Code No. 3081 / N

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) II – Semester (New) (Suppl.) Examination, Nov. / Dec. 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 moment area method? Where is it used conveniently? 3

2 What do you mean by propped cantilever beams? What is the use of propping the beam? 2

3 Derive an expression for the fixing moments, when one of the supports of a fixed beam sinks down by '¢ ' from its original position. 3

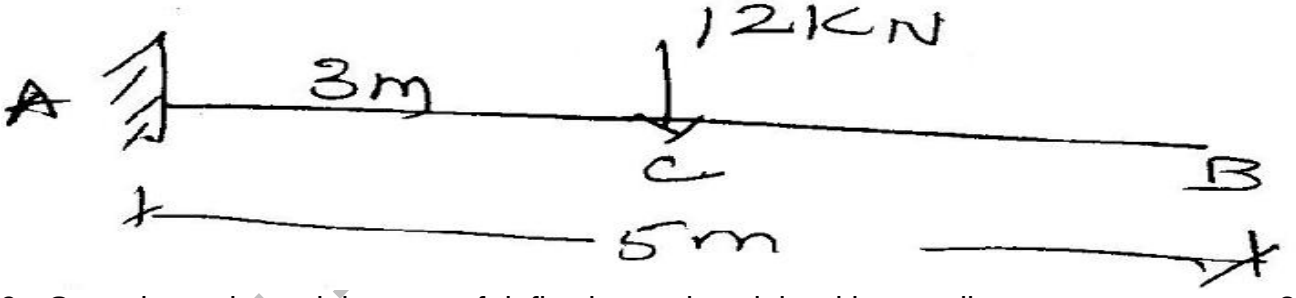
4 How will you apply Clapeyron's theorem of three moments to a continuous beam with simply supported ends. 2

5 A laminated spring 0.9 m long is made up of plates each 5 cm wide and 1 cm thick. If the bending stress in the plate is limited to 120 N/mm^2, how many plates would be required to enable the spring to carry a central point load of 2.65 kN? If $E = 2.0 \times 10^5$ N/mm^2. 3

6 Explain how the failure of a short and of a long column takes place. 2

7 Prove that the maximum stress induced in a body due to suddenly applied load is twice the stress induced when the same load is applied gradually. 3

8 Find the slope and deflection at free end, $E = 2 \times 10^5$ N/mm^2, $I = 5 \times 10^8$ mm^4. 2

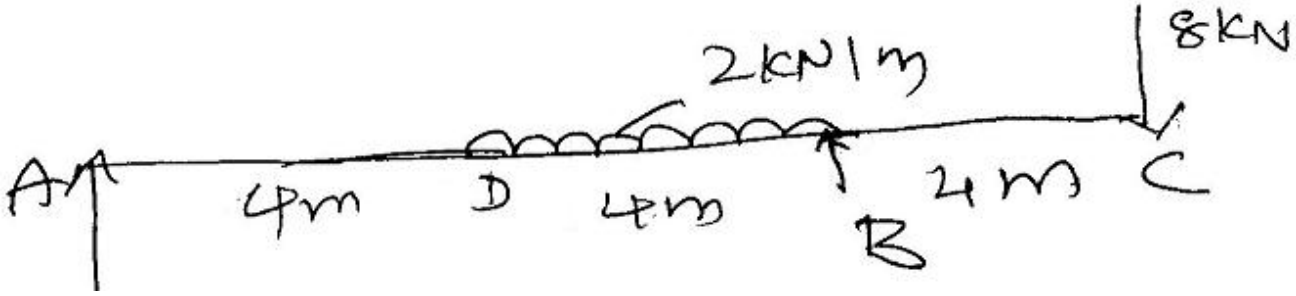


9 State the reciprocal theorem of deflection and explain with neat diagram. 3

10 State the advantages of tension coefficient method of analysis used for analyzing truss. 2

PART – B (5x10 = 50 Marks)

11 An overhanging beam ABC is loaded as shown in Figure. Determine the deflection of the beam at point C and also slope at A. Take $E = 2 \times 10^5$ N/mm^2, $I = 5 \times 10^8$ mm^4.



12 A cantilever of length 4 m carries a uniformly distributed load of 2 kN/m run over the whole length. The cantilever is propped rigidly at the free end. If E = 1 x 10^5 N/mm^2 and I = 10^8 mm^4. Then determine
   i) Reaction at the rigid prop support
   ii) The deflection at the centre of the cantilever and
   iii) Magnitude and position of maximum deflection.

13 A fixed beam of length 6 m carries point loads of 20 kN and 15 kN at distances 2 m and 4 m from the left end A. Find the fixed end moments and the reactions at supports. Draw B.M. and S.F. diagram.

14 A continuous beam ABC consists of two consecutive spans AB and BC of lengths 8 m and 6 m respectively. The beam carries a uniformly distributed load of 1 kN/m over span AB and 1.5 kN/m over span BC respectively. The end A is fixed and C is simply supported. Find support moments and reactions. Draw BM and SF diagrams.

15 A closely coiled helical spring of round steel wire 8 mm in diameter having 10 complete turns with a mean diameter of 10 cm is subjected to an axial load of 250 N. Determine:
   i) The deflection of the spring
   ii) Maximum shear stress in the wire
   iii) Stiffness of the spring
   Take C = 8 x 10^4 N/mm^2.

16 A 2.0 m long column has a circular cross-section of 6 cm diameter one of the ends of the column is fixed in direction and position and other end is free. Taking factor of safety as 3. Calculate the safe load using:
   i) Rankine formula, take yield stress s_c = 550 N/mm^2 and $\alpha = \frac{1}{1600}$ for pinned end
   ii) Euler's formula Young's formula for C.I = 1.3 x 10^5 N/mm^2.

17 A vertical round steel rod 2 m long is securely held at its upper end. A weight can slide freely on the rod and its fall is arrested by a stop provided at lower end of the rod when the weights falls from a height of 2.5 cm above the stop the maximum stress reached in the rod is estimated to be 1450 kgF/cm^2. Determine the stress in the rod if the load had been applied gradually and also the maximum stress if the load had fallen from a height of 45 m. Take E = 2.0 x 10^6 kgF/cm^2.

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Code No. 3051/O

FACULTY OF ENGINEERING

B.E. 2/4 (EE/Inst.) II - Semester (Old) Examination, November / December 2016

Subject : Solid Mechanics

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

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

PART – A (25 Marks)

1 Draw the stress – strain curve for a mild steel. (3)
2 Define Poisson's ratio and volumetric strain. (2)
3 What is point of contraflexure? Explain with example? (3)
4 Give the relationship between shear force and bending moment. (3)
5 If mean shear stress in a circular section is 400 kN/m^2 , what is the maximum shear stress? (3)
6 Draw the shear stress distribution for Rectangular and I-sections. (3)
7 Obtain the slope and deflections for the beam as shown in figure 1. (2)

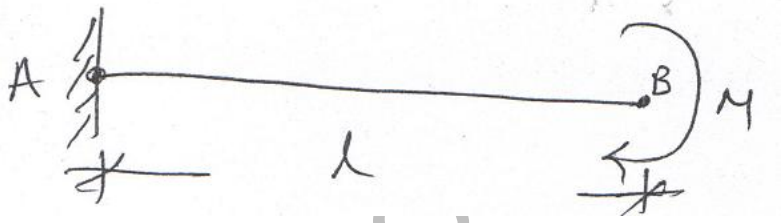

Figure 1

8 Explain double integration method and its advantages. (2)
9 Explain the expression for combined bending and Torsion. (2)
10 Define Helix. (2)

PART – B (50 Marks)

11 A copper sleeve, 21 mm internal and 27 mm external diameter, surrounds a 20mm steel bolt one end of the sleeve being in contact with shoulder of the bolt. The sleeve is 60mm long. After putting a rigid washer on the other end of the sleeve, a nut is screwed on the bolt through 10 degrees. If the pitch of the threads is 2.5mm, find the stresses induced in the copper sleeve and steel bolt. Take E_s = 200 GN/m^2 and E_c = 90 GN /m^2. (10)

12 Draw the shear force and bending moment diagram shown in figure 2. (10)

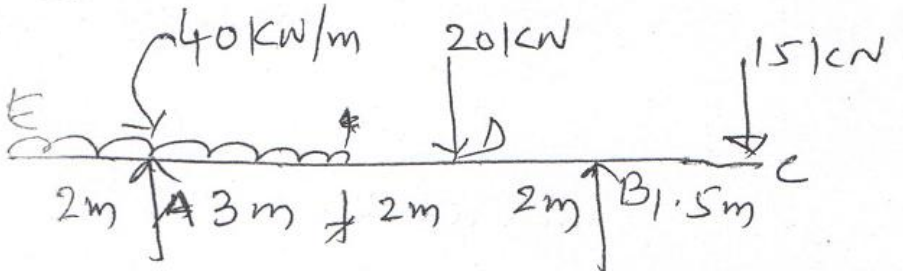

Figure 2

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13 (a) List out the assumptions made in Simple Bending theory. (3)
(b) Derive the equation for pure bending theory. (7)

14 Determine the maximum deflection of the loaded beam as shown in figure 3. Take Flexural Rigidity as EI. (10)

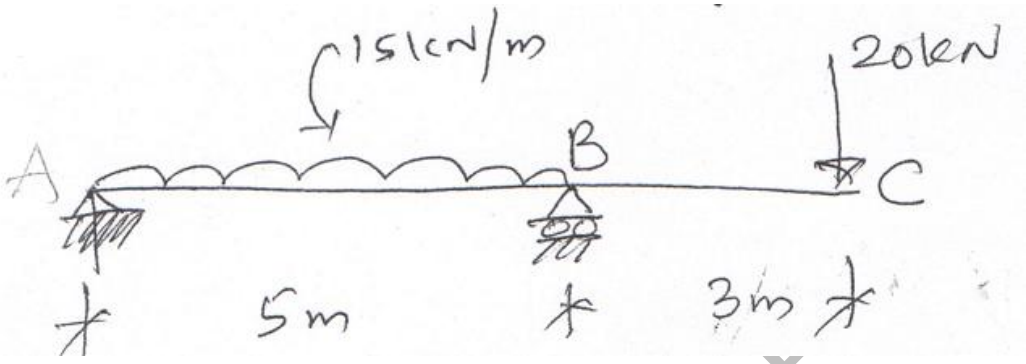

Figure 3

15 A vertical steel rod of 25 mm diameter checks the falls on its end of weight of 2.5 kN which drops through a distance of 4mm before it strikes the rod. Find the shortest length of rod which will bear the impact if the stress is not to exceed125 MN/mm^2. Take E = 220 GN /m^2. (10)

16 A rectangular steel shaft is transmitting power at 300 rpm lifting a load of 40 kN at a speed of 10m/min. If the maximum permissible shear stress in the shaft is 45 MN/m^2 and efficiency of the crane gearing is 60 percent, determine (i) size of the shaft. (ii) Angle of twist per meter length. Take C = 78.5 MN/m^2. Breadth to depth ratio = 1.5. (10)

17 A quarter elliptical spring has a length of 50 cm and consists of plates each 6 cm wide and 0.6cm thick. Find the least number of plates which can be used if deflection under gradually applied load of 3 kN is not to exceed 8 cm. E= 200 GN/m^2. (10)

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Code No. 3088 / N

FACULTY OF ENGINEERING

B.E. 2/4 (EEE \ Inst.) II – Semester (New) (Suppl.) Examination, November 2016

Subject: Solid Mechanics

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 Define hooks law. 2

2 Define modulus of elasticity and volumetric strain. 2

3 Explain shear force and bending moments. 3

4 Give relationship between shear force and bending moment. 3

5 Give any three assumptions made in pure bending theory. 3

6 Sketch the shear stress distribution for I and T sections. 3

7 Give the deflection at the free end of a cantilever of length 'ℓ' carrying a point load 'w' at its end. 3

8 Differentiate between resilience and proof resilience. 2

9 Define torsional rigidity. 2

10 Define helix. 2

PART – B (5x10 = 50 Marks)

11 A cooper rod of 40 mm diameter is surrounded tightly by a cast iron tube of 80 mm external diameter, the ends being firmly fastened together. When put to a compressive load of 30 kN, what load will be shared by each other? Also determine the amount which the compound bar shortens if it is 2 m long.
Take E_{ci} = 175 GN/m^2, E_c = 75 GN/m^2.
10

12 Draw the shear force and bending moment diagrams for Fig. 1. 10

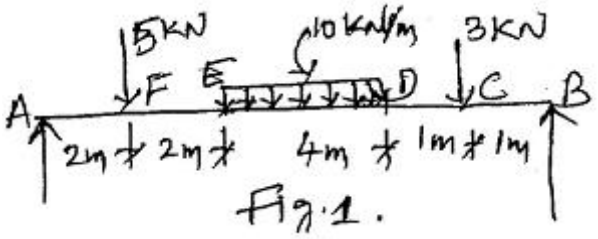

Fig. 1.

13 Define the pure bending and derive the equation for pure bending. 10

…2.

14 A short hollow pier 1.5 meter square outside and 1 m square inside, supports a vertical point load of 7 kN located on a diagonal 0.8 m from the vertical axis of the pier. Neglecting the self weight of the pier, calculate the normal stresses at the four outside corners on a horizontal section of the pier. 10

15 For the figure 2 shown find the maximum deflection where it occurs. 10

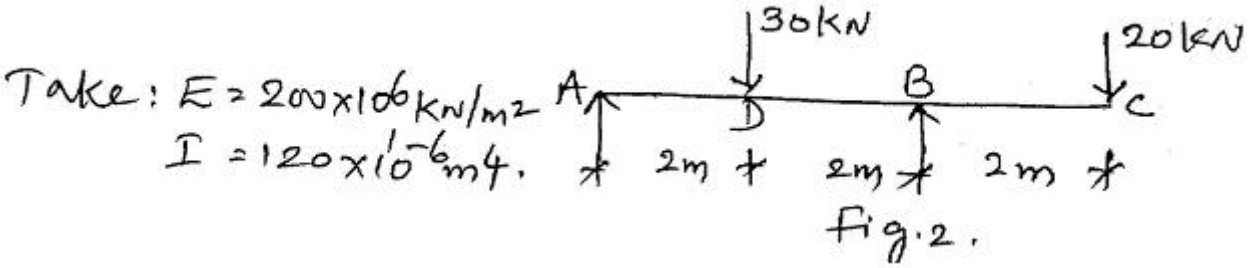

Fig.2.

16 A solid shaft transmits 250 kW at 100 rpm. If the shear stress is not to exceed 85 N/mm^2, what would be the diameter of the shaft? If this shaft is to be replaced by a hollow one whose internal diameter = 0.6 times outer diameter, determine the size and the percentage saving in weight, the maximum shearing stress being the same. 10

17 A bumper is to be designed to arrest a wagon weighing 500 kN moving at 18 Km/hr sizes of buffer springs available are having diameter = 30 mm, mean radius = 100 mm, no. of turns 18, modulus of rigidity 80 kN/mm^2 and maximum compression permitted is 225 mm. Find the number of springs required for the buffer. 10

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Code No. 3060 / O

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) II-Semester (Old) Examination, November/December 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 What are the advantages and disadvantages of transformer coupled amplifier?
2 Draw high frequency T-model of BJT and Explain.
3 Compare local and global feedback?
4 What is the effect of negative feedback on input and output resistance of current shunt feedback amplifier?
5 Why RC oscillators are not used at RF frequencies? Explain.
6 What is the need for regulation in power supplies?
7 What are the different classes of operation of power amplifiers based on efficiency?
8 What is cross-over distortion in power amplifiers?
9 What is staggered tuned amplifier?
10 What is the advantage of double tuned voltage amplifier over single tuned voltage amplifier?

PART – B (50 Marks)

11 Derive expressions for midband gain and bandwidth of two stage RC coupled BJT amplifier.

12 a) Explain the effect of negative feedback on amplifier 's gain stability and distortions.
b) Write about stability considerations of –ve feedback amplifier.

13 For Hartly oscillator, explain its operation and derive expressions for frequency of oscillations and condition of oscillations.

14 a) Compare class-B push pull and complimentary symmetry power amplifiers.
b) Prove that efficiency of class-B power amplifier is 78.6%.

15 Derive expressions for gain at resonance and bandwidth of double tuned RF voltage amplifier.

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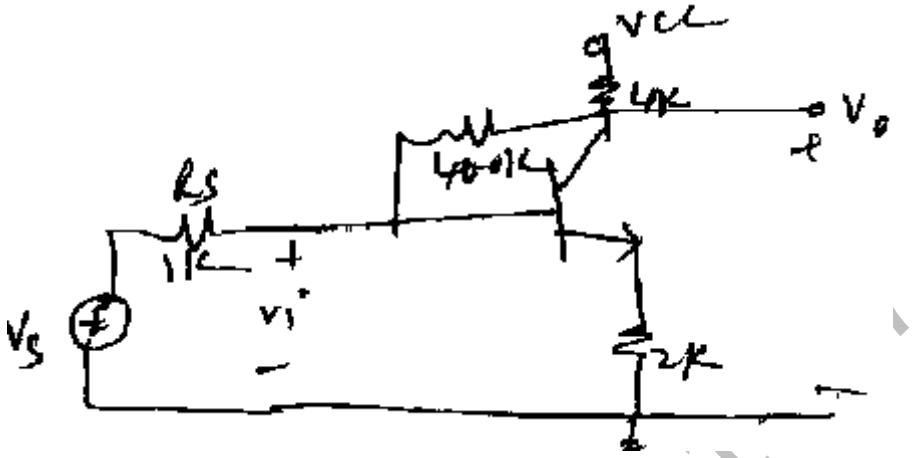
16 For the circuit shown find A_{vf}, R_{mf} and R_{of}, given h_{fe} = 100.



17 Write short notes on :

a) Transistorised shunt regulator
b) Stability of RF voltage amplifiers
c) Class AB and class D operations

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Code No. 3096/ N

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) II – Semester (New) (Main) Examination, Nov./ Dec. 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 What are the various distortions in amplifiers?

2 Give classification of amplifiers based on location of Q-point?

3 What is the effect of negative current shunt feedback on input and output impedences of amplifier?

4 A basic amplifier has gain of 100 and bandwidth 600Khz.It is connected in negative voltage series feedback with B=0.1. Find gain and bandwidth with feedback?

5 State and explain Barhausen criteria for oscillators?

6 Write about stability of oscillators?

7 What are the advantages of push-pull power amplifier?

8 Prove that cross-over distortion is reduced with class-AB operation in power amplifiers?

9 What are the requirements of RF tuned amplifiers? Classify tuned amplifiers?

10 Define selectivity and bandwidth with respect to tuned amplifiers and write their relation?

PART – B (5x10 = 50 Marks)

11 Evaluate the effect of emitter bypass and coupling capacitors on low frequency response of RC coupled BJT amplifier?

12 For the amplifier circuit shown in fig.(a), find $A_{vsf,}$ R_{mf} and R_{if} ? Assume suitable data required.

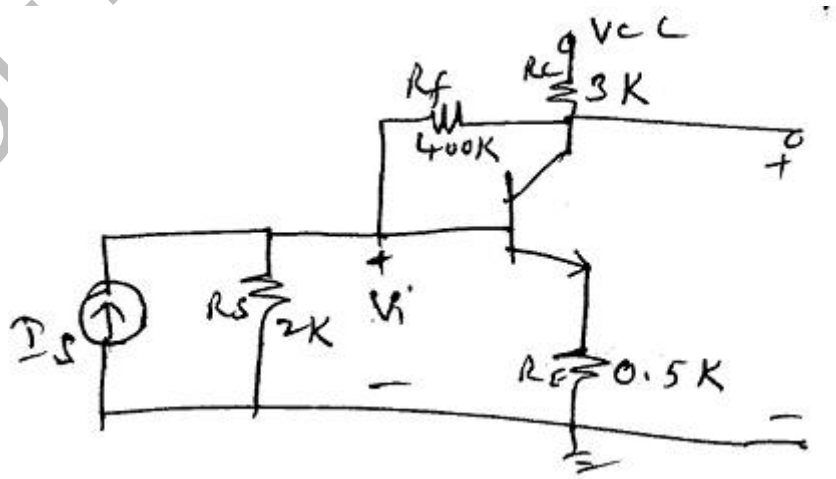

Fig. (a)

13 Derive expressions for frequency of oscillations and condition of oscillations for Hartly oscillator?

14.a) Prove that efficiency of class-B power amplifier is 78.6%?

b) Explain complimentary connection and compare it with push-pull amplifier?

15 Derive expression for gain at resonance and bandwidth for a critically coupled double tuned amplifier?

16 a) Show that frequency response is poor at high frequency for transformer coupled amplifier. Derive necessary expression?

b) Compare local and global feedbacks?

17 write short notes on –

a) Transistorised serier regulator

b) Neutralization and unilatirisation

c) Staggered tuned amplifier.

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Code No. 3068 / O

FACULTY OF ENGINEERING

B.E. 2/4 (M/P) II-Semester (Old) Examination, November / December 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 Draw the rheology diagram of Newtonian and Non-Newtonian fluids. 2

2 For a fluid of kinematic viscosity 3 x 10-4 stokes and mass density equal to 0.8 gm/cm^3. find the dynamic viscosity in Msl/m-sec. 3

3 Differentiate between gauge pressure and absolute pressure. 2

4 Define the criterion to distinguish between laminar and turbulent flow in pipes and indicate the value. 2

5 Velocity distribution in a boundary layer remains uniform. Is this statement true or false? Explain. 3

6 Obtain the expression for Bernoulli's equation in a compressible fluid when the process is Isothermal. 2

7 Explain the significance of each term of Bernoulli's equation and list the application of Bernoulli's equation. 3

8 Why stream lines and potential lines intersect orthogonally? Substantiate mathematically. 3

9 Define mach angle, zone of silence and zone of action. 3

10 Which type of drag is involved in the application of parachute? 2

PART – B (50 Marks)

11 a) Define viscosity. What do you understand by types of viscosity? Do viscosity changes with temperature for liquid and gases, if so, justify your statement. 5

b) In a three dimensional compressible fluid flow, the velocity components in 'x' and 'y' directions are U = x^2 + y^2 z^3, V = -(xy + yz + zx). Use continuity equation to evaluate an expression for the velocity component "W' in the 'z' direction. 5

12 a) Derive Euler's equation of motion for three dimensional flow and obtain Bernoulli's equation from it. 5

b) A 10 x 5 cm venturimeter is used to measure the discharge flowing in a pipe line. The mercury manometer shows a deflection of 120 mm. Assuming the co-efficient of discharge as 0.97. Determine the rate of flow of water. 5

13 a) Show that the stagnation pressure for compressible fluid can be expressed as: $P_s = P_1\left[1+\left((k-1)/2\right)M_1^2\right]^{k/k-1}$. 5

b) What is boundary layer? Explain with sketches the three methods of boundary layer control. 5

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14 a) Sketch and explain various manometers and the theory of determining the pressure. 5

b) A fluid of viscosity 0.7 N-s/m^2 and specific gravity 1.3 is flowing through a circular pipe of diameter 100 mm. The maximum shear stress at the pipe wall is given as 196.2 N/m^2. Find the pressure gradient and average velocity. 5

15 For the velocity profile for laminar boundary layer $\frac{u}{U} = 2\left[\frac{y}{¢}\right] - 2\left[\frac{y}{¢}\right]^3 + \left[\frac{y}{¢}\right]^4$, obtain an expression for boundary layer thickness, shear stress, and draw force on one side of the plate and co-efficient of drag in term of Reynolds number. 10

16 a) Explain the importance of Darcy Weisbach equation and Hagen-Poiseuille equation in flow through pipe. 5

b) Derive the continuity and energy equation for compressible flows. 5

17 Write notes on : 10

a) Turbulent boundary layer and laminar sub layer.

b) Form drag and Friction drag

c) Mach number and its significance

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Code No. 3106/ N

FACULTY OF ENGINEERING

B.E. 2/4 (M/P) II – Semester (New) (Suppl.) Examination, November 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 If a certain liquid has a dynamic viscosity of 0.073 poise and specific gravity of 0.87. Compute the kinematic viscosity of the liquid in stokes. 2

2 Distinguish between ideal and real fluids. 2

3 If stream function $(\cdot)$ = 4xy, find the velocity potential (ϕ). 3

4 What is Pitot tube? How it is used to measure velocity of flow at any point in a pipe or channel. 3

5 Convert a pressure head of 100 mts of water to: 3

i) Kerosene of specific gravity 0.81, and

ii) Carbon tetrachloride of specific gravity 1.6.

6 Define the following: 3

i) Hydraulic gradient line (HGL)

ii) Energy gradient line (EGL)

7 A fluid of viscosity 8 poise and specific gravity 1.2 is flowing through a circular pipe of diameter 100 mm. The maximum shear stress at the pipe wall is 210 N/m^2. Find the pressure gradient and the average velocity. 2

8 With the aid of sketches, illustrate the methods to avoid boundary layer separation. 3

9 Differentiate between a stream lined body and a bluff body. 2

10 What is Mach Cone. 2

PART – B (5x10 = 50 Marks)

11 a) Prove and show that the stream lines and equipotential lines form a net of mutually perpendicular lines. 5

b) A cylinder of 100 mm diameter and 300 mm length rotates about a vertical axis inside a fixed cylinder of 105 mm diameter and 300 mm length. If the space between the two cylinders is filled with liquid of dynamic viscosity 0.125 N-s/m^2, determine the speed of rotation of the cylinder which will be obtained if an external torque of 1 Nm is applied to it. 5

12 a) What is an impulse-momentum equation? Derive its expression when a flowing fluid exerts forces on a pipe bend. 5

b) A venturimeter with 150 mm diameter at inlet and 100 mm at throat is laid with its axis horizontal and is used for measuring the flow of oil of specific gravity 0.9. The oil mercury differential manometer shows a gauge difference of 200 mm. Calculate the discharge. Assume the coefficient of discharge for the venturimeter as 0.98. 5

13 a) Derive Hagen Poiseuille's equation for steady laminar flow through a circular pipe. Prove that the velocity distribution across the section is parabolic and the average velocity is half of the maximum velocity. 5

b) The discharge of water through a horizontal pipe is 0.25 m^3/sec. Its diameter, which is 200 mm suddenly, enlarges to 400 mm. If the intensity of pressure of water in the smaller pipe is 120 kN/m^2, determine:

i) Loss of head due to sudden enlargement
ii) Intensity of pressure in the large pipe
iii) Power lost due to enlargement 5

14 a) Explain the concept of boundary layer theory across a flat plate with the help of neat figures. 5

b) In a wind tunnel, experiments were conducted with a wind speed of 50 km/h on a flat plate of size 2 m long and 1 m wide. The mass density of air is 1.15 kg/m^3. the plate is kept at such an angle that coefficients of lift and drag are 0.75 and 0.15 respectively. Determine:

a) Life force b) Drag force
c) Resultant d) Power exerted by the air stream or the plate. 5

15 a) Derive Bernoulli's equation in compressible fluid flow under Adiabatic process. 5

b) Aeroplane is flying at 1000 km/hr through still air having pressure of 78.5 kN/m^2 (abs) and temperature of -8^oC. Calculate stagnation pressure, stagnation temperature and stagnation density. Take R = 287 J/Kg ^oK and K = 1.4. 5

16 a) What are manometers, classify them. Discuss the working of a micro manometer with a neat sketch. 5

b) A pipe 300 m long slopes down at 1 in 100 and tapers from 1.0 m diameter at the higher end to 0.5 m diameter at the lower and quantity of water flowing is 90 liters/sec. If the pressure at higher end is 70 kN/m^2, find the pressure at the lower end. 5

17 a) What do you mean by boundary layer separation? What is the effect of pressure gradient on boundary layer separation? Explain with the aid of neat sketch. 5

b) Experiment is conducted in a wind tunnel with a speed of 50 km/hr in a flat plate of size 1 m long and 1 m wide. The mass density of air is 1.15 kg/m^3. The plate is kept at such an angle that coefficients of lift and drag are 0.75 and 0.15 respectively. Determine

i) Lift force
ii) Drag force
iii) Resultant force
iv) Power exerted by the air stream on the plate. 5

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Code No. 3070/O

FACULTY OF ENGINEERING

B.E. 2/4 (AE) II – Semester (Old) Examination, November / December 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. Define Newtonian and Non-Newtonian fluids.
2. A pipe contains and oil of specific gravity of 0.9. A differential manometer connected at two points shows a difference in mercury level of 15 cm. Find the difference of pressure at the two points.
3. Distinguish between i) Steady flow and unsteady flow ii) Laminar and Turbulent flow.
4. Write the Bernoulis equation and write the application of Bernoullis equation.
5. Define and explain the terms : i) Hydraulic gradient line ii) Total energy line.
6. Define the terms boundary layer, boundary layer thickness, drag and lift.
7. State the various efficiency associated with turbines.
8. What are unit quantities? Define unit quantities for a turbine.
9. What are the various types of casings and impellers of centrifugal pumps.
10. Define slip, percentage slip and negative slip of a reciprocating pump.

PART – B (50 Marks)

11.a) Classify the fluids and give examples.
   b) The dynamic viscosity of oil used for lubrication between a shaft and sleeve is 0.6 N-S/m^2. The shaft is of diameter 400 mm and rotates at 190 rpm. Calculate the power lost in the bearing for a sleeve length of 90mm. The thickness of the film is 1.5 mm.

12.a) A discharge of 0.03 m^3/s of oil (specific gravity is 0.81) occurs downwards through a conversing pipeline held inclined at 60^0 to the horizontal. The inlet diameter is 200mm and the outlet diameter in 150mm and length of the pipe is 2m. If the pressure at the top of the inlet is 0.8 kgf/cm^2, find the pressure at the outlet. Neglect energy loss.
   b) Write the continuity equation for compressible and incompressible fluids.

13.a) What are the different types of losses in a pipeline?
   b) Derive Darcy-Weisbach formula for calculating loss of head due to friction in a pipe.

14.a) A Pelton wheel has a mean bucket speed of 10 meters per second with a jet of water flowing at the rate of 700 litres/s under a head of 30 meters. The buckets deffect the jet through an angle of 160^0. Calculate the power given by water to the runner and the hydraulic efficiency of the turbine. Assume co-efficient of velocity as 0.98.
   b) Differentiate between impulse and reaction turbines.

..2

15.a) What is priming? Why it is necessary?

b) The cylinder bore diameter of a single-acting reciprocating pump is 150mm and its stroke is 300mm. The pump runs at 50 rpm. and lifts water through a height of 25m. The delivery pipe is 22m long and 100mm in diameter. Find the theoretical discharge and the theoretical power required to run the pump. If the actual discharge is 4.2 litres/s, find the percentage slip.

16.a) Describe the working of a vane pump.
b) Describe the working of a Francis Turbine.

17. Write short notes on the following :

a) Air vessels
b) Viscosity of fluids
c) Significance of specific speed of Turbines

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Code No. 3108 / N

FACULTY OF ENGINEERING

B.E. 2/4 (A.E) II – Semester (New) (Suppl.) Examination, November 2016

Subject: Fluid Mechanics & 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 Distinguish between laminar flow and turbulent flow.

2 What do you understand by hydrostatic law?

3 Define the terms:

i) Velocity potential function and

ii) Stream function

4 Discuss the relative merits and demerits of venturimeter with respect to orifice meter.

5 What do you understand by the terms major and minor energy losses in pipes.

6 What are model laws or similarity laws? Explain.

7 Differentiate between pump and a turbine.

8 What is a draft tube? Write its functions.

9 Differentiate between impulse and reaction turbine.

10 What is the significance of priming in centrifugal pump?

PART – B (5x10 = 50 Marks)

11 a) Write a detailed note on manometers.

b) Determine the absolute pressure in pascal at a depth of 6 mt below the free surface of a tank of water where gage pressure is 58.86 kPa, when a barometer reads 760 mm mercury.

12 a) An oil of sp. Gravity 0.8 is flowing through a venturimeter having inlet diameter 20 cm and throat diameter 10 cm. The oil mercury differential manometer shows a reading of 25 cm. Calculate the discharge of oil through the horizontal venturimeter. Take $C_d = 0.98$.

b) Distinguish between:
i) Steady flow and un-steady flow
ii) Uniform and non-uniform flow

13 a) Determine the loss of head due to friction in pipes by using Darcy formula and Chezy's formula.

b) Define and explain the terms hydraulic gradient line and total energy line.

…2.

14 a) A pelton wheel is having a mean diameter of 0.8 m and is running at 1000 rpm. The net head on the pelton wheel is 400 m. If the side clearance angle is 15^{o} and discharge through nozzle is 150 lit/sec. Find:
   i) Power available at the nozzle and
   ii) Hydrautic efficiency of the turbine.

   b) What is an air vessel? Describe its function in reciprocating pumps.

15 What is an air vessel? Describe its function in reciprocating pumps.

16 a) What is cavitation and what are its causes? How will you prevent the cavitation in hydraulic machines?

   b) What are unit quantity? Define the unit quantities for a turbine. Why are they important?

17 Write short notes on the following:

   a) Bernoulli's equation and its applications

   b) Concept of boundary layer theory

   c) Dimensional analysis.

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Code No. 3072 / O

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) II – Semester (Old) Examination, November / December 2016

Subject : OOP 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	Differentiate abstract class and class.	2
2	Differentiate string buffer and string class.	3
3	What is the use of super keyword?	3
4	What is the use of finally keyword?	2
5	List the 4 classes used for reading byte streams.	2
6	What is the use of string Tokenizer?	2
7	Write about the vector class with example.	3
8	What is serialization? Which type variables cannot be serialized?	3
9	List the different layout managers with example.	2
10	Write about delegation event model.	3

PART – B (50 Marks)

11	a)	Explain the features and benefits of Object Oriented Development.	5
	b)	Write a program to demonstrate constructor overloading.	5
12	a)	Write a program to creation and using of user defined exception.	5
	b)	Write a program to demonstrate threads synchronization.	5
13	a)	Write a program to print the entries in the Map.	5
	b)	Write a program to check for the available memory and call the garbage collector.	5
14	a)	Write a program for mouse event handling.	5
	b)	Write a program to read username and password for any application.	5
15	a)	Write a program to copy one file content into another file.	5
	b)	Write a program to read the ‘n’ integer values from console and find the sum of all values.	5
16	a)	Write a program to sort the list of strings.	5
	b)	Write a program to create menu with submenus.	5
17	Write a short notes on the following :		3+4+3
	a)	Tree Set	
	b)	Exception Handling	
	c)	Bit Set	

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Code No. 3110 / N

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) II – Semester (New) (Suppl.) Examination, November 2016

Subject: Object Oriented Programming 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 How do you cast incompatible types? Give an example. 2

2 How to use method overloading for printing different types of array? 3

3 What will be the output of the program? 2

```
Public class x
    {
      public static void main (String [} args)
          {
           Try
              {
                Return;
                    }
                     Finally
                       {
                        System out printless (“finally”);
                         }
                      }
                     }
```

4 What is the method defined by a class implementing the java.lang.Runnable interface? 2

5 Mention the interface which provides the capability to store elements in a collection that guarantees that no duplicates are stored and all elements can be occurred in natural order.

6 What is the data type returned by the library functions 3

a) Compare To ( )

b) Equals ( )

7 What is AWT? 3

8 Define adapter class. Why is it used? 3

9 Mention the differences between closeable and flushable interfaces. 2

10 What is the necessity use of filtered Byte streams? 3

…2.

PART – B (5x10 = 50 Marks)

11 Write a java program to accept a two digit number. Add the sum of its digits to the product of its digits. If the value is equal to the number input, output the message "special 2-digit number" otherwise, "not a special 2-digit number". 10

12 Write a java program for generating four threads to perform the following operations
   a) Getting 'N' numbers as input 2
   b) Printing the even numbers 3
   c) Printing the odd numbers 3
   d) Computing the average 2

13 a) Explain string tokenizer with an example. 5

   b) Why collection hierarchy does not include maps? How are the elements or key value pairs are converted into collection set. Explain with an example. 5

14 What is a frame? Write a java program to illustrate the use of frames. 10

15 With a java program illustrate the use of I/0 streams. 10

16 a) Explain polymorphism encapsulation and inheritance. Give examples. 5

   b) State the purpose of finalize ( ) method in java with an example. 5

17 Discuss the exception handling in java with example. 10

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Code No. 3076 / O

FACULTY OF INFORMATICS

B.E. 2/4 (IT) II - Semester (Old) Examination, November / December 2016

Subject : Signals and Systems

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

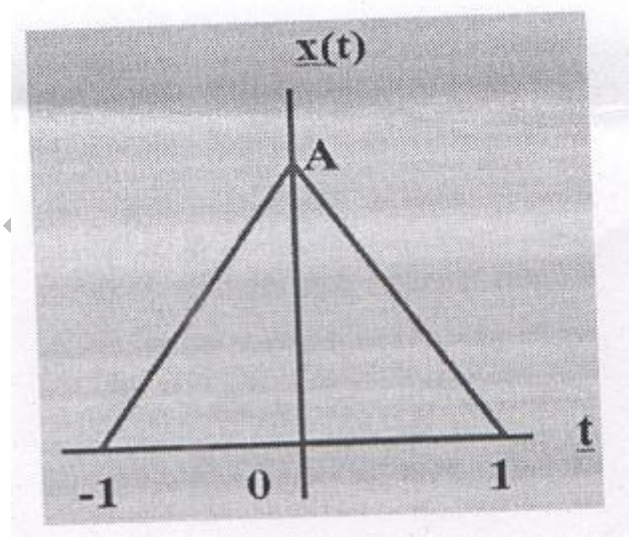
Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Find the even and odd components of the signal sin(2t) + cost(t) (2)
2 How do you obtain exponential Fourier series coefficients from trigonometric Fourier series coefficients? (3)
3 State and Dirichlet's conditions for the existence of Fourier Transform. (3)
4 Find the Laplace Transform of u(t). (2)
5 Define band limited signal. (2)
6 How to overcome aliasing effect? (3)
7 Find the Z – Transform of $\delta(n)$. (2)
8 Write any three properties of Auto-correlation. (3)
9 State the BIBO stability criterion. (2)
10 Define the Impulse response and Transfer function of an LTI system. (3)

PART – B (50 Marks)

11 (a) For the signal x(t) shown in the figure. Sketch the following. (6)
(i) x(t + 1) (ii) x(t/2 - 1) (iii) x(1- t) (iv) x(2t)

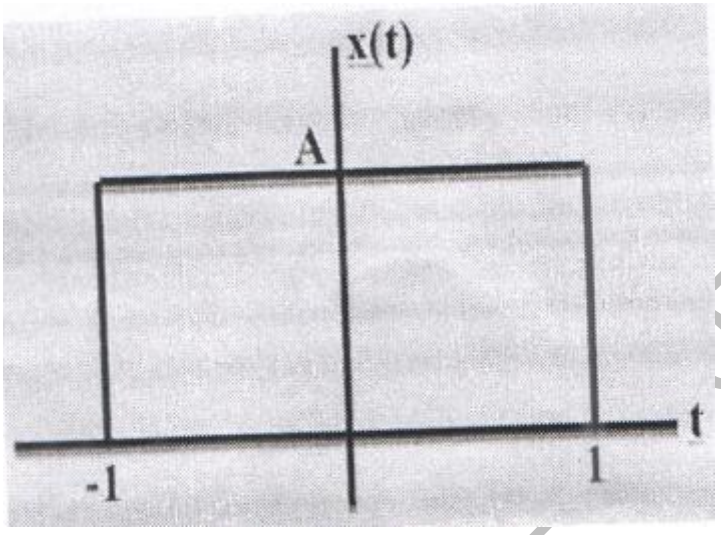


(b) Determine whether the given signal x(t)=sin(2t) is an energy signal or power signal. (4)

12 (a) Explain Time shifting, Time scaling and Limits of signals with suitable examples. (6)
(b) Sketch the following. (4)
(i) u(n-3) (ii) $\delta(n+1)$ (iii) u(n+3)-u(n-2)

..2

13 (a) For the signal x(t) shown in the figure. Find the Fourier Transform. (5)



(b) Find the Inverse Laplace Transform of $X(s) = \frac{(s+2)}{(s+4)(s+3)}$. (5)

14 (a) State and explain sampling theorem for band limited signals. (7)
(b) Find the Nyquist Rate and Nyquist Interval for the signal (3)
X(t)=sinc(100πt)+2sinc(50πt).

15 (a) Find the Inverse Z-Transform of $X(z) = \frac{z}{(3z^2 - 4z + 1)}$. (6)

(b) If Z[x(n)]=X(Z), prove that Z[x(-n)]=$X\left(\frac{1}{z}\right)$. (4)

16 (a) Check whether the following systems are Time-invariant or not. (4)
(i) y(t) = t. x(t + 2)
(ii) $y(t) = x(t - 2) + e^{x(t)}$
(b) Find the Transfer function and impulse response of an LTI system described by differential equation. (6)

$$\frac{d^2}{dt^2} y(t) + 8\frac{d}{dt} y(t) + 12 y(t) = 2\frac{d}{dt} x(t) + x(t)$$

17 (a) Explain any three properties of Laplace Transform with suitable examples. (6)
(b) Write a MATLAB program to generate a square wave. (4)

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Code No. 3114 / N

FACULTY OF INFORMATICS

B.E. 2/4 (I.T) II – Semester (New) (Suppl.) Examination, Nov. / Dec. 2016

Subject: Signals & Systems

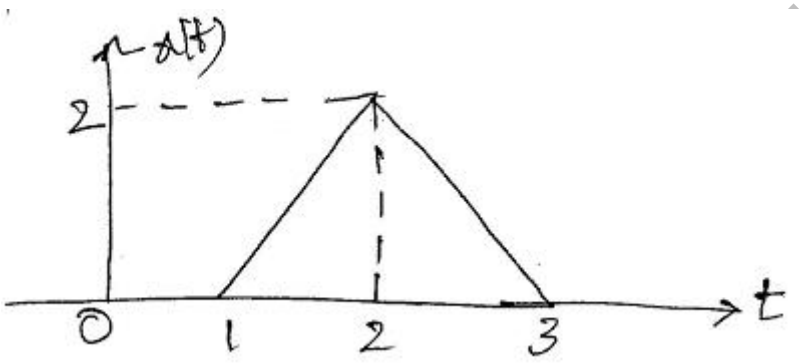
Time: 3 Hours **Max.Marks: 75**

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

PART – A (25 Marks)

1 Define a signal and a system. 2

2 Write the mathematical representation for the following signal. 3



3 Write the conditions for existence of Fourier series. 3

4 What is signal energy? 2

5 Write initial value and final value theorem of LT. 3

6 Give classification of discrete time signals. 2

7 State sampling theorem. 2

8 What are the values of ~ for which system is stable, whose system function

$H(z) = \frac{2}{z - \alpha}$ 3

9 What is the relation between LT and ZT 2

10 Explain the properties of ZT 3

PART – B (5x10 = 50 Marks)

11 Determine the complex exponential Fourier series expansion of the periodic signal shown in Fig. 11(a).

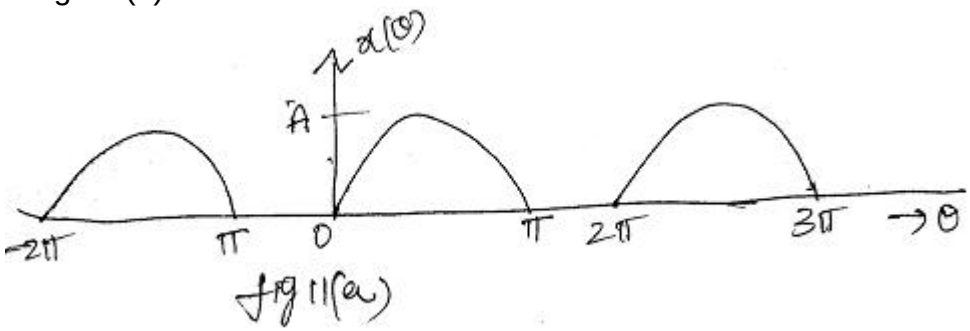


fig 11(a)

…2.

12 a) Find Fourier transform pairs for the following 6

i) Sgn(t)

ii) $e^{-a/|t|}$ $(a > 0)$

iii) $e^{J w t_o}$

b) Explain the properties of laplace transforms. 4

13 a) Show that product of two even signals or of two odd signals is an even signal and the product of an even and odd signal is an odd signal. 5

b) Determine whether the following system is static, time variant and causal.

8 $y'(t) + t.y(t) = 2x(t)$

14 a) Find z transform of $x(n) = \alpha^{\eta}.u(-n-1)$. 5

b) Explain properties of DTFT. 5

15 a) Explain different representations of Fourier series. 5

b) Prove that if $n(t) \leftrightarrow x(w)$ then $n(at) = \frac{1}{|a|} x \left|\frac{w}{a}\right|$. 5

16 a) Determine y(n) if $y(z) = \frac{1}{z^2 - 1.5z + 0.2}$ 5

b) What is ADC? Explain its components in detail. 5

17 Write short notes on 10

a) Lumped parameter and distributed parameter systems

b) System realization

c) Ideal and practical fitters.

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