

III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016
GEOTECHNICAL ENGINEERING – I
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is compulsory
 3. Answer any **THREE** Questions from **Part-B**

PART -A

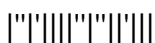
- 1 a) List any two types of field compaction equipment. Also list any two types of soil structures [4M]
- b) What are the corrections to be applied to hydrometer test readings [3M]
- c) Write the formula to determine height of capillary rise in a soil and mention what each term of the formula stands for? [4M]
- d) What is an Isobar? [3M]
- e) Define normally consolidated clay? Write the formula to determine the compression index in terms of liquid limit. [3M]
- f) Define shear strength of a soil. What are the names of shear tests based on drainage conditions? [5M]

PART -B

- 2 a) Write short notes on texture and structure of soils. [8M]
- b) Explain about transported soils and soil formation. [8M]
- 3 a) What are the limitations of hydrometer test? [8M]
- b) The following results were recorded in a shrinkage limit test using mercury [8M]

Mass of container	=17.0g
Mass of wet soil and container	=72.30g
Mass of dish	=132.40g
Mass of dish and displaced mercury	=486.10g
Mass of dry soil and container	=58.20g
Volume of wet soil	=32.4 cm ³

Determine the shrinkage limit, the linear shrinkage and the shrinkage ratio. The density of mercury is 13.6g/cm³.
- 4 a) Write notes on soil water [8M]
- b) A falling head permeability test is to be performed on a soil sample whose coefficient of permeability is 3×10^{-5} cm/s. What diameter of the standpipe should be used if the head is to drop from 27.5cm to 20.0cm in 5 minutes and if the cross-sectional area and length of the sample are respectively 15cm² and 8.5cm? [8M]



- 5 a) With a sketch explain the construction of a Newmark's chart? [8M]
 b) i) A long strip footing of width 2m transmits a pressure of 200kPa to the underlying soil. Using 2 : 1 dispersion method, compute the approximate value of the vertical stress at a depth of 5m below the footing. [8M]
 ii) A line load of 100kN/m run extends to a long distance. Determine the intensity of vertical stress at a point 2m below the surface at a distance of 2m perpendicular to the line load. Use Boussinesq's theory
- 6 a) Explain briefly the laboratory consolidation test [8M]
 b) In a consolidation test the pressure on a sample was increased from 150 to 300kN/m². The void ratio after 100% consolidation under 150kN/m² was 0.945, and that under 300kN/m² was 0.812. The coefficient of permeability of the soil was 25×10^{-6} mm/s and the initial height of the sample was 20mm. Determine (i) the coefficient of compressibility, (ii) the coefficient of volume compressibility [8M]
- 7 a) Write a note on the laboratory box shear test. [8M]
 b) The following results were obtained from a triaxial test on two soil specimens. [8M]

Sample No.	Confining Pressure(kPa)	Deviator Stress at failure(kPa)	Pore water pressure(kPa)
1	200	244	55
2	300	314	107

Determine the shear strength parameters of the soil terms of (i) total stresses
 ii) effective stresses



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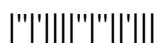
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**PART –A**

- 1 a) List the names of three important clay minerals [3M]
- b) Define a sand particle as per IS classification system. Write the formula to determine the coefficient of uniformity of a soil. [4M]
- c) Write the relationship between discharge velocity and seepage velocity and also state Darcy's law [3M]
- d) List the assumptions of Boussinesq's theory [4M]
- e) Write Terzaghi's one-dimensional consolidation equation and mention what each term of the formula stands for. [4M]
- f) What is the name of the test used to determine quickly the un drained shear strength of soft clay? Write the formula to determine the sensitivity of a clay. [4M]

**PART -B**

- 2 a) What are the two basic structural units of clay minerals? Explain them [8M]
- b) Write a short note about diffuse double layer and base exchange capacity. [8M]
- 3 a) What is meant by consistency of soils? Define all the Atterberg limits [8M]
- b) The following data refer to a sample of soil: [8M]  
 Percent passing 4.75 mm IS Sieve = 64  
 Percent passing 75- $\mu$  IS Sieve = 6,  
 Uniformity Coefficient = 7.5  
 Coefficient of Curvature = 2.7, Plasticity index = 2.5%  
 Classify the soil as per IS soil classification.
- 4 a) Derive the formula to compute the height of capillary rise in soils. [8M]
- b) Determine the average horizontal and vertical permeability coefficients of a soil deposit made up of three horizontal strata, each 1m thick, if the coefficients of permeability are  $1 \times 10^{-1}$  mm/s,  $3 \times 10^{-2}$  mm/s and  $8 \times 10^{-3}$  mm/s respectively for the three layers. [8M]
- 5 a) Write a note on 2:1 stress distribution method. [8M]
- b) A ring foundation of 10m external diameter and 9m internal diameter carries a uniformly distributed load of 150kPa. Determine the vertical stress due to the load at a depth of 6m below the centre of the foundation. [8M]



- 6 a) Explain Casagrande's method to determine the coefficient of consolidation [8M]  
 b) In a consolidation test the pressure on a sample was increased from 140 to 280kN/m<sup>2</sup>. The void ratio after 100% consolidation under 140kN/m<sup>2</sup> was 0.95, and that under 280kN/m<sup>2</sup> was 0.82. The coefficient of permeability of the soil was  $20 \times 10^{-6}$  mm/s and the initial height of the sample was 20mm. Determine (i) the coefficient of consolidation, and (ii) the time taken in days for 90% consolidation of the layer of this clay, 0.5mm thick in the field, sandwiched between an impervious layer beneath and the pervious layer on top. [8M]
- 7 a) Write a note on the laboratory triaxial shear test. [8M]  
 b) The following results were obtained from a direct shear test on a sandy clay sample. [8M]

| Normal load (N) | Shear load proving ring reading (divisions) |
|-----------------|---------------------------------------------|
| 360             | 13                                          |
| 720             | 19                                          |
| 1080            | 26                                          |
| 1440            | 26                                          |

If the shear box is 60mm square and the proving ring constant is 20N per division, estimate the shear strength parameters of the soil. Would failure occur on a plane within this soil at a point where the normal stress is 320kN/m<sup>2</sup> and the corresponding shear stress is 138kN/m<sup>2</sup>?

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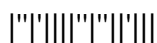
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PART -A

- 1 a) Define degree of compaction. What is zero air voids line and its significance [4M]
- b) Define a gap graded soil. Also write the equation of the A-line and mention what each term of the equation stands for. [5M]
- c) What is quick sand condition? [3M]
- d) When is Newmark's influence chart applicable? What are the differences between Boussinesq's and Westergaard's theories [4M]
- e) List the two methods used for finding the coefficient of consolidation. [3M]
- f) Define Critical Void Ratio and explain in which state sand can have cohesion. [3M]

PART -B

- 2 a) Derive the relationship between bulk unit weight of a soil, specific gravity and degree of saturation. [8M]
- b) Write about the factors affecting the compaction properties of a soil. [8M]
- 3 a) Write a short note on the corrections to be applied to hydrometer test readings [6M]
- b) The undisturbed soil at a pit has a water content of 15%, void ratio 0.60 and specific gravity of 2.70. The soil from the pit is to be used to construct a rolled fill having a finished volume of 35000m³. The soil is to be transported from the pit to the construction site by trucks having a net carrying capacity of 6tons. After completion, the fill soil has a water content of 18% and dry density of 1.70 g/cm³. Calculate the total number of trips the truck will have to make to construct the rolled fill. [10M]
- 4 a) With the help of a sketch of a flow net, derive the formula to determine the quantity of seepage through an earth dam. [8M]
- b) A soil profile consists of a surface layer of sand 3m thick ($\gamma=16\text{kN/m}^3$), an intermediate clay layer 2m thick ($\gamma_{\text{sat}}=19.25\text{kN/m}^3$), and a bottom layer of gravel 4m thick ($\gamma_{\text{sat}}=19\text{kN/m}^3$). The water table is at the top of the clay layer. Determine the effective stress at various interfaces. There is a surcharge of 50kN/m² on the ground surface. [8M]



- 5 a) With a sketch explain the construction of a Newmark's chart? [8M]
b) Two point loads P and Q act on the ground surface 8m apart. The magnitude of P is 100kN and that of Q is 80kN. Point A is at a depth of 6m directly below P and point B is at a depth of 5m directly below Q. Point C is between P and Q and it is at a distance of 4m from P. Point C lies at a depth of 3m below the ground surface. Calculate the increase in vertical stresses at A, B and C due to the point loads. [8M]
- 6 a) Explain Taylor's method to determine the coefficient of consolidation [8M]
b) A consolidation test was performed on a 20mm thick undisturbed clay sample. 50% consolidation occurred in 5 minutes. The sample was drained both at the top and at the bottom. In the field, the clay layer is 2.4m thick and is underlain by an impervious rock. Drainage is possible only at the top surface. (i) Determine the coefficient of consolidation and (ii) calculate the time in days for 50% and 90% consolidation to take place in the field deposit. [8M]
- 7 a) Explain the shear characteristics of sand? [8M]
b) In an unconfined compression test, a sample of sandy clay 8cm long and 4cm in diameter fails under a load of 120N at 10% strain. Compute the shearing resistance taking into account the effect of change in cross-section of the sample. [8M]



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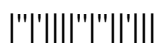
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**PART -A**

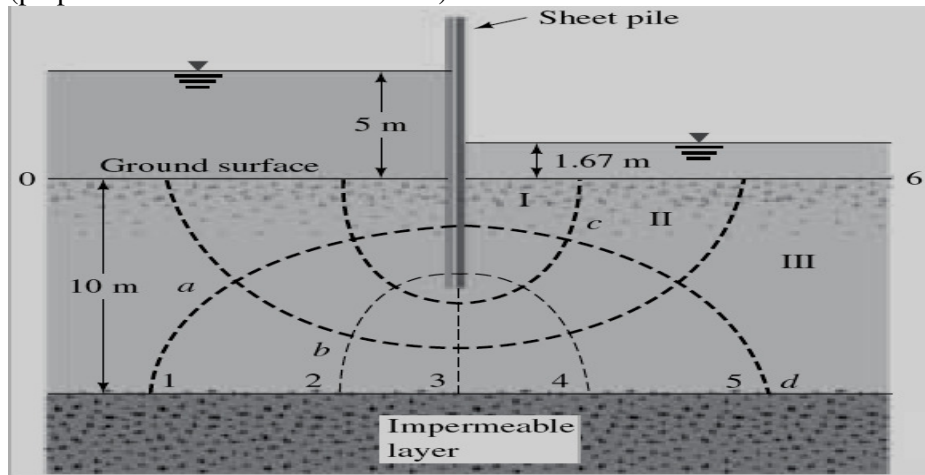
- 1 a) List any four factors affecting the compaction of a soil [4M]
- b) Define consistency of a soil and liquid limit of soil [4M]
- c) Define equipotential line. What is the name of the topmost flow line of an earth dam [3M]
- d) What is the increase in vertical stress at a point 5m below a point load of 100kN, using Boussinesq's theory? [3M]
- e) Write the formula to determine the time factor, when the degree of consolidation is more than 60%. Define over-consolidation ratio [4M]
- f) What is usual length to diameter ratio of a lab triaxial test sample? What is the formula of additional axial stress and what is another name for additional axial stress [4M]

**PART -B**

- 2 a) Write a short note on adsorbed water and relative density. [8M]
- b) How is compaction control achieved in the field? [8M]
- 3 a) Draw neatly the IS plasticity chart and label it. [8M]
- b) In a hydrometer test, the initial reading is 1.08. After one hour, the corrected hydrometer reading is 1.03 and the corresponding effective depth is 12cm. Find the initial weight of soil placed in 1000cc suspension, the particle size corresponding to the 15min reading, and the percentage of particles finer than this size. Take  $G = 2.65$ , and  $\mu = 0.1$  poise. [8M]
- 4 a) Derive the expression to determine the average coefficient of permeability in the horizontal direction for a stratified soil deposit. [8M]



- b) A flow net for flow around a single row of sheet piles in a permeable soil layer is shown in Figure. Given that  $k_x = k_z = k = 5 \times 10^{-3}$  cm/s
- i) How high (above the ground surface) will the water rise, if piezometers are placed at points **a** and **d**?
- ii) What is the rate of seepage through flow channel II per unit length (perpendicular to the section shown)?



- 5 a) Write a note on 2:1 stress distribution method [6M]
- b) A three-legged tower forms an equilateral triangle of side 4m in plan. If the total weight of the tower is 450kN and is equally carried by all the legs, compute the vertical stress increase caused in the soil by the tower at a depth of 4m directly below one of the legs and also at the same depth below the centroid of the triangle. [10M]
- 6 a) Describe Casagrande's method of geometrical construction to find the pre-consolidation pressure. [8M]
- b) The settlement analysis of a proposed structure indicated that 5cm of settlement will occur in three years and the total settlement will be 150mm. The analysis was based on the assumption that the compressible layer is drained only at the top surface. However further investigations showed that there will be drainage both at the bottom and the top of the layer. For the case of double drainage, calculate (i) ultimate total settlement, (ii) time required for 50mm of settlement. [8M]
- 7 a) Explain the stress-strain behaviour of clays. [8M]
- b) In a direct shear test on a specimen of clean dry sand, a normal stress of 180kPa was applied and failure occurred at a shear stress of 100kPa. Determine analytically the angle of shearing resistance, the principal stresses during failure, and directions of the principal planes with respect to the direction of the plane of shearing. [8M]

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**III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016**  
**ELECTRICAL MEASUREMENTS**  
 (Electrical and Electronics Engineering)

Time: 3 hours

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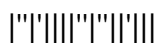
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PART -A

- | | | |
|------|--|------|
| 1 a) | Write about extension of range of ammeter and voltmeter. | [3M] |
| b) | What is phantom loading? | [4M] |
| c) | What is standardization and calibration? | [4M] |
| d) | List out various bridges used by capacitance measurement and their applications. | [3M] |
| e) | What is a ballistic galvanometer? Where is it used? | [4M] |
| f) | What is a digital voltmeter? What are various types of DVM? | [4M] |

PART -B

- | | | |
|------|--|------|
| 2 a) | What are the types of errors in measurements? | [4M] |
| b) | Explain the operation of PMMC instrument. | [8M] |
| c) | What is the reason for using MI instruments on both AC and DC? | [4M] |
| 3 a) | Explain the operation of dynamometer type single phase power factor meter. | [8M] |
| b) | Give the construction and operating principle of single phase induction type energy meter. | [8M] |
| 4 a) | Explain the procedure for making measurements with Crompton's potentiometer. | [8M] |
| b) | Explain the operation of coordinate type AC potentiometer. | [8M] |
| 5 a) | Draw Maxwell's AC bridge and give the balance equation of resistance. | [8M] |
| b) | Describe working of low voltage Schering bridge. Derive equation of capacitance and dissipation factor | [8M] |
| 6 a) | Explain flux meter with suitable diagram. | [8M] |
| b) | Explain how core loss is determined by bridges and potentiometer. | [8M] |
| 7 a) | Explain the operation of digital multimeter. | [8M] |
| b) | Explain how frequency is measured from Lissajous patterns in CRO. | [8M] |



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 (Electrical and Electronics Engineering)

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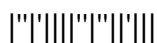
**PART -A**

- 1 a) How the current transformer and potential transformer are connected in a circuit? [3M]  
What is the precaution to be followed while using current transformer?
- b) What is creeping? How is it avoided? [4M]
- c) State the applications of AC potentiometers. [4M]
- d) Why is the Wheatstone bridge not suitable for measuring low resistance? [3M]
- e) What are core losses? How are they measured? [4M]
- f) What are the advantages and limitations of digital instruments over analog instruments? [4M]

**PART -B**

- 2 a) What is the importance of deflecting torque in analog instruments? [4M]
- b) Explain the construction and operation of moving iron instruments. [8M]
- c) The range of 1mA ammeter having an internal resistance of 100 ohms is to be extended to 100 mA ammeter. Calculate the value of the resistance of required shunt. [4M]
- 3 a) What is the working principle of wattmeter employed in measuring equipment? [4M]
- b) Describe the operation of electrical resonance type frequency meter. [8M]
- c) Explain the procedure for testing by phantom loading. [4M]
- 4 a) Explain the principle and operation of DC Crompton's potentiometer. [8M]
- b) Explain the operation of polar type AC potentiometer. [8M]
- 5 a) Write briefly on measurement of high resistance by loss of charge method. List the precautions to be taken in this method. [8M]
- b) Describe the circuit of Kelvin double bridge used for measurement of low resistance. Derive the conditions for balance. [8M]
- 6 a) Explain constructional features and working of flux meter. [8M]
- b) Describe the step by step method for determination of B-H curve of a magnetic material. [8M]
- 7 a) Explain the operation of ramp type digital voltmeter with a neat block diagram. [8M]
- b) Explain the operation of digital tachometer. [8M]

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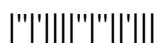
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PART -A

- 1 a) Define ratio and phase angle errors in instrument transformers. [3M]
- b) Write about extension of range of wattmeter using instrument transformers. [4M]
- c) What is the basic principle used in potentiometer? What are the practical difficulties in AC potentiometer? [4M]
- d) Draw the Maxwell's bridge and give the balance equation. [3M]
- e) What are core losses? How are they measured? [4M]
- f) How phase difference and time delay is measured with oscilloscope? [4M]

PART -B

- 2 a) Write about extension of range of ammeters and voltmeters. [4M]
- b) Describe the construction and working of PMMC instrument. [8M]
- c) Derive the equation for deflection torque if the instrument is spring controlled. [4M]
- 3 a) What is driving torque and braking torque in an energy meter. [3M]
- b) Explain the operation of three phase dynamometer type wattmeter. [8M]
- c) Explain the principle of operation of maximum demand meter. [5M]
- 4 a) Discuss how unknown resistance, current and voltage are measured with potentiometer. [8M]
- b) Explain the operation of coordinate type potentiometer. [8M]
- 5 a) Derive the bridge balance condition for the Schering bridge. [8M]
- b) Draw the circuit diagram of Wien's bridge and explain the measurement procedure for measuring unknown frequency using this bridge. Derive the formula used. [8M]
- 6 a) Explain the method of reversals for a magnetic specimen in finding out B-H loop. [8M]
- b) Discuss Campbell's bridge method to measure iron losses. [8M]
- 7 a) Explain the operation of digital frequency meters? [8M]
- b) Explain with neat circuit diagram the working of successive approximation type digital voltmeter. [8M]



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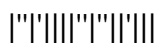
**PART -A**

- 1 a) Classify the instruments based on their function. [3M]
- b) Explain how LPF wattmeter is different from UPF wattmeter. [4M]
- c) Why calibration is required for measuring instruments. [4M]
- d) What are the different types of resistances? What are the different methods used for measuring these resistances? [4M]
- e) What is a ballistic galvanometer? Where is it used? [3M]
- f) What are the advantages and limitations of digital instruments over analog instruments? [4M]

**PART -B**

- 2 Draw the equivalent circuit and phasor diagram of a PT. Derive the expression for its ratio and phase angle errors. [16M]
- 3 a) Explain the operation of Weston type Synchroscope. [8M]
- b) With neat figures, explain the construction, working principle of three phase wattmeter. [8M]
- 4 a) Explain the operation of polar type AC potentiometer. [8M]
- b) Describe with help of suitable diagrams how a DC potentiometer can be used for calibration of ammeter and wattmeter. [8M]
- 5 a) Sketch the circuit diagram of Anderson's bridge. Derive the equations for resistive and inductive components of the inductor to be measured. [8M]
- b) All four resistances in a Wheatstone bridge are  $1k\Omega$ , the galvanometer has a  $100\Omega$  resistance and  $0.05\mu A/mm$  sensitivity, and the supply is 20 V. Determine the minimum change that can be detected in the measured resistance. [8M]
- 6 a) Describe the method of determination of B-H curve of a magnetic material using method of reversals [8M]
- b) Discuss how iron loss of bar samples is determined. [8M]
- 7 a) Explain how CRO helps in various measurements. [8M]
- b) Explain with neat circuit diagram the working of any one type of digital voltmeter. [8M]

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**III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016****DYNAMICS OF MACHINERY**

(Comm. to ME and AME)

Time: 3 hours

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**PART -A**

- 1 a) Explain what do you understand by gyroscopic stabilization [3M]
- b) State the laws of (i) Solid friction (ii) Dynamic friction and (iii) Fluid friction. [3M]
- c) What do you mean by fluctuation of energy and fluctuation of speed of crank shaft [3M]
- d) What is the function of a governor? How does it differ from that of flywheel? [4M]
- e) Explain the terms "primary and secondary distributing force" [5M]
- f) What do you mean by torsionally equivalent shaft? [4M]

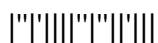
**PART -B**

- 2 The turbine rotor of a ship has a mass of 20 tonnes and a radius of gyration of 0.75 m. Its speed is 2000 r.p.m. The ship pitches 60 above and below the horizontal position. One complete oscillation takes 18 seconds and the motion is simple harmonic. Determine (a) the maximum couple tending to shear the holding down bolts of the turbine. (b) The maximum angular acceleration of the ship during pitching and (c) The direction in which the bow will tend to turn while rising, if the rotation of the rotor is clockwise when looking from rear. [16M]
- 3 a) A conical pivot bearing 150 mm in diameter has a cone angle of  $120^\circ$ . If the shaft supports an axial load of 20 kN and the coefficient of friction is 0.03, find the power lost in friction when the shaft rotates at 200 rpm, assuming uniform pressure and uniform wear. [8M]
- b) Determine the axial force required to engage a cone clutch transmitting 25 kw of power at 750 rpm. Average friction diameter of the cone is 400 mm, and the average pressure intensity is  $60\text{kN/m}^2$ . Semi cone angle is  $10^\circ$  and the coefficient of friction is 0.25. [8M]
- 4 The turning moment diagram for a petrol engine is drawn to vertical scale of 1mm to 6 N-m, and a horizontal scale of 1 mm to  $1^\circ$ . The turning moment repeats itself after every half revolution of the engine. The areas above and below the mean torque line are 305, 710, 50, 350, 980, and  $275\text{ mm}^2$ . The rotating parts amount to a mass of 40 kg at a radius of gyration of 140 mm. Calculate the co-efficient of fluctuation of speed if the speed of engine is 1500 rpm. [16M]



- 5 a) State the different methods to determine the equilibrium speed of a Porter Governor. [6M]
- b) A Porter governor has arms 250 mm each and four rotating fly balls of mass 0.8 kg each the sleeve movement is restricted to  $\pm 20$  mm from the height when the mean speed is 100 rpm calculate the central dead load and sensitivity of the governor neglecting friction when the fly ball exerts the centrifugal force of 9.81 N. Determine also the effort and power of the governor for 1% speed change [10M]
- 6 a) Explain the terms: variation of tractive force, swaying couple, and hammer blow. [6M]
- b) Each crank of a four cylinder vertical engine is 225 mm. The reciprocating masses of the first, second and the third cranks are 100 kg, 120 kg and 100 kg and the planes of rotation are 600 mm, 300 mm and 300 mm from the plane of rotation of the third crank. Determine the mass of the reciprocating parts of the third cylinder and the relative angular positions of the cranks if the engine is in complete primary balance. [10M]
- 7 a) Discuss briefly with neat sketches the longitudinal transverse and torsional free vibrations. [6M]
- b) A vibrating system consists of a mass of 10 kg, spring stiffness 12 N/mm and a dash pot of damping coefficient of 0.06 N/mm/sec. [10M]
- i.** damping factor, **ii.** logarithmic decrement and **iii.** ratio of the two consecutive amplitudes

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**III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016****DYNAMICS OF MACHINERY**

(Comm. to ME and AME)

Time: 3 hours

Max. Marks: 70

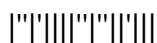
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 2. Answering the question in **Part-A** is compulsory  
 3. Answer any **THREE** Questions from **Part-B**
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**PART -A**

- 1 a) State the three useful applications of the gyroscopic action. [3M]
- b) What is a Wedge? Explain how wedge is useful to raise the heavy loads. [4M]
- c) What is the function of fly wheel in a prime mover? [3M]
- d) What is meant by the term, stability of a governor? [4M]
- e) Define the terms Swaying couple and hammer blow. [4M]
- f) Explain magnification factor. [4M]

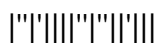
**PART -B**

- 2 A four wheeled motor car of mass 2000 kg has a wheel base 2.5 m, track width 1.5 m and height of center of gravity 500 mm above the ground level and lies at 1 m from the front axle. Each wheel has an effective diameter of 0.8 m and a moment of inertia of  $0.8 \text{ kg-m}^2$ . The drive shaft, engine flywheel and transmission are rotating at 4 times the speed of road wheel, in a clockwise direction when viewed from the front, and is equivalent to a mass of 75 kg having a radius of gyration of 100 mm. If the car is taking a right turn of 60 m radius at 60 km/h, find the load on each wheel. [16M]
- 3 a) Determine the axial force required to engage a cone clutch transmitting 25 kW of power at 750 rpm. Average friction diameter of the cone is 400 mm, semi cone angle  $10^\circ$  and coefficient of friction 0.25. Also find the width of the friction cone. [8M]
- b) Describe with a neat sketch the method of operation of rope brake dynamometer. [8M]
- 4 The equation of a turning moment curve at a three crank engine is  $2500 + 750 \sin 3\theta$  N m where  $\theta$  is the crank angle in radians. The mean speed of the engine is 240 rpm. The flywheel and other rotating parts attached to the engine have a mass of 500 kg at a radius of gyration of 1m calculate [16M]
  - (i) the power of the engine
  - (ii) total fluctuation of the speed of the flywheel in percentage when the resisting torque is constant.
- 5 a) State the different methods to determine the equilibrium speed of a Porter governor [6M]
- b) A Porter governor has arms 250 mm each and four rotating fly balls of mass 0.8kg each the sleeve movement is restricted to 20 mm from the height when the mean speed is 100 rpm. Calculate the central dead load and sensitivity of the governor neglecting friction when the fly ball exerts the centrifugal force of 9.81 N. Determine also the effort and power of the governor for 1% speed change [10M]



- 6 a) Prove the relation that Hammer blow =  $\pm m_b \times r^* \times \omega^2$  [8M]  
where  $m_b$  = Balancing mass placed at a radius of  $r^*$  and  $\omega$  = angular speed of the crank.
- b) Three masses of 8 kg, 12 kg, and 15 kg attached at radial distances of 80, 100, and 60 mm respectively to a disc on a shaft are in complete balance. Determine the angular positions of the masses of 12 kg and 15 kg relative to the 8 kg mass. [8M]
- 7 a) Define the term of Whirling speed of shaft [4M]
- b) A coil of spring stiffness 60 N/mm supports vertically a load of 3 kN at the free end. [12M]  
The motion is resisted by the oil dashpot. It is found that the amplitude at the beginning of the fourth cycle is 0.6 times the amplitude of the previous vibration. Find the ratio of the frequencies of damped and un damped vibrations.

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**III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016****DYNAMICS OF MACHINERY**

(Comm. to ME and AME)

Time: 3 hours

Max. Marks: 70

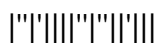
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- ~~~~~

**PART -A**

- 1 a) Explain the terms spin and precession. How do they differ from each other? [3M]  
 b) What is the difference between the simple and differential band brake? [4M]  
 c) What is turning movement diagram? Mention its uses. [3M]  
 d) Explain the terms: Sensitiveness and Stability [3M]  
 e) Explain the term partial balancing of primary force. Why it is necessary? [5M]  
 f) What do you mean by logarithmic decrement? [4M]

**PART -B**

- 2 a) Explain gyroscopic effects on four wheels. [4M]  
 b) A gear engine automobile is traveling along a curved track of 120m radius. Each of the four wheels has a moment of inertia of  $2.3 \text{ kg m}^2$  and an effective diameter of 600 mm. The rotating parts of the engine have a moment of inertia of  $1.25 \text{ kg m}^2$  the gear ratio of the engine to back wheel is 3:2. The engine axis is parallel to the gear axle and the crank shaft rotates in the same sense as the road wheels. The mass of the vehicle is 2050 kg and the center of mass is 520 mm above the road level. The width by the track is 1.6m, what will be the limiting speed of the vehicle if all the four wheels maintain contact with the road surface. [12M]
- 3 a) A flat foot step bearing 300mm in diameter supports a load of 8kN. If the coefficient of friction is 0.1, and the speed of the shaft is 80 rpm, find the power lost in friction, assuming uniform wear. [8M]  
 b) A torsion dynamometer is fitted on a turbine shaft to measure the angle of twist. It is observed that the shaft twists  $2^\circ$  in a length of 5 m at 600 rpm. The shaft is solid and has a diameter of 250 mm. If the modulus of rigidity is 84 GPa, find the power transmitted by the turbine. [8M]
- 4 a) Explain the function of a flywheel from a crank effort diagram. [6M]  
 b) In a reciprocating engine, length of stroke is 30 cm and connecting rod is 60 cm long between centres. When the piston has travelled 8 cm from the inner dead centre, find  
 i) angular position of the crank ; ii) velocity and acceleration of the piston ;  
 iii) angular velocity of connecting rod, if the engine speed is 240 rpm. [10M]



- 5 a) What is meant by the term, stability of a governor? Derive the necessary conditions of stability for a centrifugal governor. [6M]
- b) For a spring controlled Hartnell type governor, following data is provided: mass of the governor ball is 2 kg, length of the vertical arm of bell crank lever is 800 mm, and length of the other arm of bell crank lever is 90 mm. The speeds corresponding to radii of rotations 120 mm and 130 mm are 300 rpm and 310 rpm respectively. Determine the stiffness of spring. [10M]
- 6 a) Four masses  $m_1, m_2, m_3$  and  $m_4$  having 100, 175, 200, and 25kg fixed to cranks of 20cm radius and revolve in places 1, 2, 3 and 4. The angular position of the cranks in planes 2, 3 and 4 with respect to the crank in plane 1 are 75° same sense. The distances of planes 2, 3 and 4 from plane 1 are 60cm, 186cm and 240cm respectively. Determine the position and magnitude of the balance mass at a radius of 60cm in plane L and M located at the middle of the plane 1 and 2 and the middle of the planes 3 and 4 respectively. [12M]
- b) Describe reasons for partial balancing of reciprocating masses. [4M]
- 7 a) Discuss the effect of inertia of the shaft in longitudinal and transverse vibrations. [6M]
- b) A shaft 40 mm diameter and 2.5 m long has a mass of 15 kg/m length. It is simply supported at the ends and carries three masses 90 kg, 140 kg and 60 kg at 0.8 m, 1.5 m and 2 m respectively from the left support. Taking  $E = 20 \text{ GN/m}^2$ . Find the frequency of transverse vibrations [10M]

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**III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016****DYNAMICS OF MACHINERY**

(Comm. to ME and AME)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answering the question in **Part-A** is compulsory  
 3. Answer any **THREE** Questions from **Part-B**

**PART -A**

- 1 a) What is the principle of gyroscope? [3M]  
 b) State the laws of static and dynamic friction [4M]  
 c) What do you mean by resisting torque? What are the conditions for fly wheel to accelerate and retard? [4M]  
 d) Compare the functions of a fly wheel and a governor. [4M]  
 e) What do you mean by static balancing and dynamic balancing? [3M]  
 f) What do you mean by over, under and critical damping systems? [4M]

**PART -B**

- 2 a) Derive an expression for gyroscopic couple in standard form. [6M]  
 b) A ship is propelled by a turbine rotor which weighs 5 KN and rotates at a speed of 2100 rpm. The rotor has radius of gyration of 50 cm and rotates clockwise when viewed from stern. Find the gyroscopic effects in each of the following cases. [10M]  
 i) The ship turns to the left at a speed of 8.3m/sec  
 ii) The ship pitches so that the bow rises from the horizontal plane with an angular velocity of 1 rad/sec.
- 3 a) Derive an expression for the effort to be applied on a body for moving it down the rough inclined plane when effort applied is horizontal. [8M]  
 b) A simple band brake is operated by a lever of length 500 mm. The brake drum has a diameter of 500 mm and the brake band embraces 5/8 of the circumference. One end of the band is attached to the fulcrum of the lever while the other end is attached to a pin on the lever 100 mm from the fulcrum. If the effort applied to the end of the lever is 2 kN and the coefficient of friction is 0.25, find the maximum braking torque on the drum. [8M]
- 4 The turning moment diagram for the engine is drawn to the following scales: [16M]  
 Turning moment, 1 mm = 1000 N-m, and for crank angle is 1 mm = 6°. The areas above and below the mean turning moment line taken in order are: 530, 330, 380, 470, 180, 360, 350, 280 mm<sup>2</sup>. The mean speed of the engine is 150 rpm and the total fluctuation of speed must not exceed 3.5% of mean speed. Determine the diameter and mass of the flywheel rim, assuming that total energy of the flywheel is to be 15/14 that of rim. The peripheral velocity of the flywheel is 15 m/s. Find also the suitable cross sectional area of the rim of the flywheel. Take density of the rim material as 7200 kg/m<sup>3</sup>



- 5 In a Proell governor, each ball weighs 2.5 kg; length of each of the main four arms in 20cms, the extended arm is 8 cm long. The pin joints of the main arm are 4 cm from the axis of the governor. For the sleeve to be on its bottom stop the distance between the top and bottom hinge points of the main arms is 30 cm and then the extended arm is vertical. Find the weight of central load when the sleeve just leaves the bottom stop at 150 rpm. What will be the speed of the governor after the sleeve has been raised to 4 cm? [16M]
- 6 A rotating shaft carries four radial masses A = 8 kg, B = C = 6 kg, and D = 5 kg. The mass centers are 30 mm, 40 mm, 40 mm, and 50 mm respectively from the axis of the shaft. The axial distance between the planes of rotation of A and B is 400mm, and that between B and C is 500 mm. The masses A and C are at right angles to each other. Find for a complete balance, (a) the angle between the masses B and D from mass A, (b) the axial distance between the planes of rotation of C and D, and (c) the magnitude of mass B. [16M]
- 7 A machine weighing 180 N is mounted on springs and dash pots. The equivalent stiffness of the spring is 88 N/cm and the equivalent damping is 1.2 Ns/cm. If the system is initially at rest and a velocity of 10cm/sec is imparted to the mass, determine,  
i) The displacement and velocity of the mass as a function of time  
ii) The displacement at time equal to 1 sec. [16M]

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**III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016**  
**PULSE AND DIGITAL CIRCUITS**

(Comm. to ECE and EIE)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
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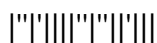
**PART -A**

- |   |    |                                                                               |      |
|---|----|-------------------------------------------------------------------------------|------|
| 1 | a) | What is meant by linear wave shaping?                                         | [3M] |
|   | b) | Draw a circuit to transmit that part of a sine wave, which is below + 6 V.    | [4M] |
|   | c) | How the junctions of transistor are biased for closed switch and open switch. | [3M] |
|   | d) | Write the applications of Schmitt trigger?                                    | [4M] |
|   | e) | Define the Transmission error and explain its significance.                   | [4M] |
|   | f) | What is meant by sampling gate and give its applications?                     | [4M] |

**PART -B**

- |   |    |                                                                                                                                                                                                                                                                                                                                                                  |       |
|---|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2 | a) | Discuss about response of high pass circuit for exponential input.                                                                                                                                                                                                                                                                                               | [8M]  |
|   | b) | A square wave whose peak to peak amplitude is 4 V extends $\pm 2$ V with respect to ground. The duration of the positive section is 0.3 s and that of the negative section is 0.1 s. If this waveform is impressed upon an RC differentiating network whose time constant is 0.3 s, what are the steady state maximum and minimum values of the output waveform? | [8M]  |
| 3 | a) | Explain the working of transistor clipper.                                                                                                                                                                                                                                                                                                                       | [8M]  |
|   | b) | A symmetrical 50 Hz square wave whose peak to peak excursions are $\pm 100$ V with respect to ground is to be negatively clamped at 25 V. Draw the necessary circuit diagram and output waveform for this purpose.                                                                                                                                               | [8M]  |
| 4 | a) | Compare different logic families                                                                                                                                                                                                                                                                                                                                 | [6M]  |
|   | b) | Design and Explain CMOS NAND gate.                                                                                                                                                                                                                                                                                                                               | [10M] |
| 5 | a) | Derive the expression for frequency of oscillation of an a stable multi vibrator.                                                                                                                                                                                                                                                                                | [8M]  |
|   | b) | Design a Schmitt trigger circuit for the following specification: UTP = 8 V, LTP = 5 V, $V_{CC} = 15V$ , $I_C(\text{sat}) = 2$ mA, $h_{FE}(\text{min}) = 25$ .                                                                                                                                                                                                   | [8M]  |
| 6 | a) | Explain about Exponential sweep circuit and derive the expression for Slope error.                                                                                                                                                                                                                                                                               | [8M]  |
|   | b) | Find the component values of a bootstrap sweep generator, Given $V_{CC} = 18$ V, $I_C(\text{sat}) = 2$ mA and $h_{FE}(\text{min}) = 30$ .                                                                                                                                                                                                                        | [8M]  |
| 7 | a) | Explain how mono stable multi vibrator is used as frequency divider?                                                                                                                                                                                                                                                                                             | [8M]  |
|   | b) | Explain about unidirectional diode sampling gate. Write its advantages and disadvantages.                                                                                                                                                                                                                                                                        | [8M]  |

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**III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016**  
**PULSE AND DIGITAL CIRCUITS**

(Comm. to ECE and EIE)

Time: 3 hours

Max. Marks: 70

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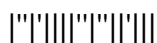
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PART -A

- 1 a) What is the condition for low pass circuit to act as integrator? [3M]
- b) What are the applications of voltage comparators? [4M]
- c) Explain the dependence of $V_{CE(sat)}$ on temperature. [4M]
- d) What is the purpose of commutating capacitors? [3M]
- e) Draw the circuit diagram of a sweep circuit using a transistor switch. Also sketch its output waveform. [4M]
- f) Write the applications of sampling gates. [4M]

PART -B

- 2 a) Explain the response of high pass circuit for square wave input. [8M]
- b) A square wave whose peak to peak amplitude is 4 V extends ± 2 V with respect to ground. The duration of the positive section is 0.1 s and that of the negative section is 0.3 s. If this waveform is impressed upon an RC integrating network whose time constant is 0.3 s, what are the steady state maximum and minimum values of the output waveform? [8M]
- 3 a) With neat circuit diagram, explain the working of an emitter coupled clipper. [8M]
- b) Explain the clamping circuit considering the source resistance and the diode forward resistance. [8M]
- 4 a) Explain about Diode forward recovery time and Diode reverse recovery time. [8M]
- b) Compare the various logic families. [8M]
- 5 a) With neat circuit diagram, Explain the working of fixed bias bistable multi vibrator. [8M]
- b) Calculate the component values of a mono stable multi vibrator developing an output pulse of 500 μ s duration. Assume $h_{FE(min)} = 25$, $I_{CE(sat)} = 5$ mA, $V_{CC} = 10$ V and $V_{BB} = -4$ V. [8M]
- 6 a) List out the various methods to generate a time base waveform. [8M]
- b) The specifications of UJT are given as $\eta = 0.6$, $V_V = 2$ V, $R_{BB} = 5$ k Ω , $I_V = 1.5$ mA, $I_P = 8$ μ A and $V_{BB} = 18$ V. Calculate the component values of the UJT sweep circuit to generate an output sweep frequency of 10 kHz with sweep amplitude of 12 V. [8M]
- 7 a) Explain the synchronization of a sweep circuit with symmetrical signals. [8M]
- b) With neat circuit diagram, Explain bidirectional sampling gate using transistors. [8M]



III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016
PULSE AND DIGITAL CIRCUITS
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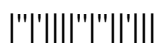
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 3. Answer any **THREE** Questions from **Part-B**

PART -A

- | | | | |
|---|----|---|------|
| 1 | a) | What is the condition for High pass circuit to act as differentiator? | [3M] |
| | b) | Write the difference between clipping and clamping. | [4M] |
| | c) | Define rise time and storage time. | [4M] |
| | d) | What is meant by triggering? Why it is needed? | [4M] |
| | e) | Write the relationship between Transmission error and displacement error. | [4M] |
| | f) | What is pedestal? | [3M] |

PART -B

- | | | | |
|---|----|--|------|
| 2 | a) | Sketch the response of low pass RC circuit for step input and derive the expression for rise time. | [8M] |
| | b) | An ideal $2\mu\text{s}$ pulse is fed to an amplifier. Calculate and plot the output waveform when the upper 3-dB frequency is (a) 5 MHz and (b) 0.05 MHz | [8M] |
| 3 | a) | State and prove clamping circuit theorem. | [8M] |
| | b) | A symmetrical 50 Hz square wave whose peak to peak excursions are ± 100 V with respect to ground is to be positively clamped at 25 V. Draw the necessary circuit diagram and output waveform for this purpose. | [8M] |
| 4 | a) | Explain the design of transistor switch. | [8M] |
| | b) | Draw the circuit diagram of Two in put TTL NAND gate and explain its operation. | [8M] |
| 5 | a) | Explain about direct connected binary. Write the advantages and disadvantages of it. | [8M] |
| | b) | Design a stable multi vibrator to generate a square wave of 1 kHz frequency with a duty cycle of 25% using silicon n-p-n transistors with $h_{FE}(\text{min}) = 40$. | [8M] |
| 6 | a) | Explain the basic principles of Miller and Bootstrap time base generators. | [8M] |
| | b) | Discuss about Transistor Current Time Base Generator. | [8M] |
| 7 | a) | What is meant by synchronization? Why it is needed? Explain. | [8M] |
| | b) | Explain about four diode sampling gate. | [8M] |



III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016
PULSE AND DIGITAL CIRCUITS
 (Comm. to ECE and EIE)

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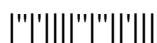
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 3. Answer any **THREE** Questions from **Part-B**

PART -A

- | | | | |
|---|----|---|------|
| 1 | a) | Write short notes on Ringing Circuit. | [3M] |
| | b) | What is the difference between linear wave shaping and non linear wave shaping? | [4M] |
| | c) | Sketch the piece-wise linear diode characteristics. | [3M] |
| | d) | What is clamping theorem? | [4M] |
| | e) | Write the difference between voltage time base generator and current time base generator. | [4M] |
| | f) | Write the disadvantages of two diode sampling gate. | [4M] |

PART -B

- | | | | |
|---|----|---|------|
| 2 | a) | Discuss about RL Low pass circuit and RL High pass circuit. | [8M] |
| | b) | A 1 KHz square wave output from an amplifier has rise time $t_r = 350$ ns and tilt = 5 %. Determine the upper and lower 3- dB frequencies. | [8M] |
| 3 | a) | Explain the working of negative clamping circuit. | [8M] |
| | b) | Design a diode clamper to restore the negative peaks of the input signal to zero level. Use a silicon diode with $R_f = 50 \Omega$ and $R_r = 400$ k Ω . The frequency of the input signal is 5 kHz. | [8M] |
| 4 | a) | Explain about transistor switching times. | [8M] |
| | b) | Draw the circuit diagram of Inverter Using CMOS logic and explain its operation. | [8M] |
| 5 | a) | With neat circuit diagram, Explain the working of the emitter – coupled binary. | [8M] |
| | b) | Design a collector coupled one-shot with a gate width of 3 ms using n-p-n transistors. Assume necessary data. | [8M] |
| 6 | a) | With neat sketch, explain about transistor miller time base generator. | [8M] |
| | b) | Derive the expression for sweep time of sweep circuit using UJT. | [8M] |
| 7 | a) | Explain about phase delay and phase jitters. | [8M] |
| | b) | Explain how pedestal can be reduced in gate circuit. | [8M] |



III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016**COMPILER DESIGN**

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is compulsory
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART -A

- 1 a) What is the difference between pass and phase? [3M]
- b) Why left recursion has to be eliminated from grammar? [3M]
- c) Differentiate between LR and LALR parsers. [4M]
- d) What is Attribute grammar? Give Example. [4M]
- e) What is the use reference counting garbage collector? [4M]
- f) Define common sub expression. How to identify it? [4M]

PART -B

- 2 a) Write short notes on functions of semantic analysis. [8M]
- b) What is the role of regular expression in lexical analysis? Explain with examples. [8M]
- 3 a) Write about different grammars used to specify the syntax of languages and explain with an example how grammars can be used to derive input strings in different ways. [8M]
- b) Check whether the given grammar $G: S \rightarrow 1AB \mid \epsilon \quad A \rightarrow 1AC \mid 0C \quad B \rightarrow 0S \quad C \rightarrow 1$ is LL(1) or not? [8M]
- 4 a) What is Dangling ELSE ambiguity? How it can be solved with LR parsers? Explain with an example. [8M]
- b) Construct CLR parse table for $S \rightarrow AA \quad A \rightarrow aA \mid d$ [8M]
- 5 a) Explain how to generate three address codes with syntax directed definitions with an example. [8M]
- b) Write short notes on i) Formats of three address code ii) Construction syntax tree for expressions [8M]
- 6 a) What is meant by activation of procedure? How it can be represented with activation tree and record? Explain with quick sort example. [8M]
- b) Explain the functional issues to be considered while generating the object code. [8M]
- 7 Consider the pseudo code for quick sort and perform all the function preserving transformation techniques on flow graph of it. [16M]



III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016**COMPILER DESIGN**

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

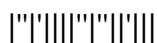
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PART -A

- 1 a) Differentiate front end and back end. [3M]
- b) Show that the grammar $E \rightarrow E + E | E * E | (E) | id$ is ambiguous. [4M]
- c) Write the rules to compute operator precedence [3M]
- d) Generate three address code for the given pseudo code while($i \leq 10$) { $A = A * B + 20$
 $i++$ print(A value) } [4M]
- e) Write short notes on parameter passing mechanisms. [4M]
- f) Write about inter procedural optimization. [4M]

PART -B

- 2 a) What is Scanner? Design simple scanner and explain with scanner algorithm. [8M]
- b) How to specify the tokens? Differentiate token, lexeme and pattern with suitable examples. And draw transition diagrams also. [8M]
- 3 a) Discuss the process of error recovery in predictive parsing [6M]
- b) What is LL(1) parser? Construct the LL(1) parser for $G: S \rightarrow (L) | a$ $L \rightarrow L, S | S$ and check the acceptance of input string (a,(a,a)) [10M]
- 4 a) With neat sketch explain the structure of LR parser and the rules to compute LR item. [8M]
- b) What is operator grammar? How $G: S \rightarrow a | (T)$ $T \rightarrow T, S | S$ can be parsed through operator precedence parser. [8M]
- 5 a) Differentiate synthesized and inherited attributes with example. [8M]
- b) What is an Abstract syntax tree? How to construct it? Explain by writing syntax directed definition. [8M]
- 6 a) What is symbol table? Explain the different organization of symbol table. [8M]
- b) Write short notes register allocation and assignment with graph coloring technique. [8M]
- 7 a) Explain about i) Instruction Scheduling ii) Elimination of Loop invariant variable [8M]
- b) Generate the flow graph for dot product of two matrices and perform some local optimizations. [8M]



III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016**COMPILER DESIGN**

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

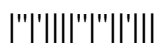
Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is compulsory
 3. Answer any **THREE** Questions from **Part-B**

PART -A

- 1 a) What is the role of lexical analyzer? [3M]
- b) How to left factor the grammar? Give Example. [4M]
- c) Show that Bottom up parsing is right most derivation in reverse order. [4M]
- d) What is syntax directed definition? Give example. [4M]
- e) What is the role of Control stack in runtime support package? [3M]
- f) What is the use of machine idioms? Give example. [4M]

PART -B

- 2 a) Relate transition diagrams and Scanner. Draw Transition diagram for recognition of tokens, Reserved words and identifiers. [8M]
- b) Compiler is translator and interpreter is simulator-Justify this statement with differences between them. [8M]
- 3 a) Discuss the following **i)** Left Recursion **ii)** Recursive descent parser [8M]
- b) State and explain the rules used to compute first and follow functions with the help of $E \rightarrow E+T \mid T$ $T \rightarrow T*F \mid F$ $F \rightarrow F*|alb$ [8M]
- 4 Construct SLR parser for the given grammar and check the acceptance of input string of your own $R \rightarrow R+|+R \mid R \mid R*|@|alb$ [16M]
- 5 a) Discuss various methods to get the evaluation order of semantic rules. [8M]
- b) What is the role of type system in type checker? Write the syntax directed definition for type checker. [8M]
- 6 a) Explain various ways to access non local variables. [8M]
- b) What is machine dependent optimization? Explain how peephole techniques functions in this? [8M]
- 7 Explain the following
 - a) Common sub expression and dead code elimination [6M]
 - b) Copy propagation, constant folding. [5M]
 - c) Strength Reduction [5M]



III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016**COMPILER DESIGN**

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

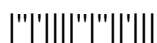
Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is compulsory
 3. Answer any **THREE** Questions from **Part-B**

PART -A

- | | | | |
|---|----|--|------|
| 1 | a) | Draw the transition diagram of user defined identifiers. | [3M] |
| | b) | Write the rule to find the first and follow function. | [4M] |
| | c) | Compare the performance of LR parsers. | [4M] |
| | d) | What is semantic rule and abstract syntax tree? | [4M] |
| | e) | What is the need for symbol table? | [3M] |
| | f) | Write the rules to construct the flow graph for intermediate code. | [4M] |

PART -B

- | | | | |
|---|----|---|-------|
| 2 | a) | How to generate object code for $X=Y+Z*15$ through different phases of compiler? | [8M] |
| | b) | Write the regular expressions and transition diagrams for set of words having a,e,i,o,u appearing in that order but not necessarily consecutively. | [8M] |
| 3 | a) | What is parser? Explain different parsing techniques and differentiate them. | [6M] |
| | b) | Construct the non recursive predictive parser for the given grammar
$S \rightarrow AalbAclBclbBa$ $A \rightarrow d$ $B \rightarrow d$ and also check the acceptance of input sting bdc | [10M] |
| 4 | a) | Write the algorithm to construct LALR parser and explain the same with grammar
$S \rightarrow L=R R$ $L \rightarrow *R id$ $R \rightarrow L$ | [8M] |
| | b) | Write short notes on i) Reasons for using LR parses ii) Stack implementation of Shift Reduce parser. | [8M] |
| 5 | a) | Write short notes on functions of semantic analysis. | [8M] |
| | b) | What is syntax directed translation? Write the semantic rules $D \rightarrow TL$ $T \text{ int real}$
$L \rightarrow L, id id$ | [8M] |
| 6 | a) | Write the algorithm for simple code generator. And show with an example how instruction scheduling can affect the efficiency of generated code. | [8M] |
| | b) | Explain any two storage allocation strategies with pros and cons. | [8M] |
| 7 | a) | Explain how loop optimization can be done? How they are different from local optimizations. | [8M] |
| | b) | What is code optimization? Explain about various levels and types of optimizations. | [8M] |



Code No: R31026

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, October/November - 2016

LINEAR & DIGITAL IC APPLICATION

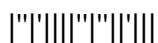
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

**Answer any FIVE Questions
All Questions carry equal marks**

- | | | |
|---|--|-------|
| 1 | a) Define Integrated circuit. Discuss about classification of IC's. | [8M] |
| | b) Enlist the Characteristics of Dual input unbalanced output configuration. | [7M] |
| 2 | a) Explain the Ideal and Practical op-amp specifications with examples. | [8M] |
| | b) Explain about IC 741 Op-amp and its features. | [7M] |
| 3 | Draw and explain the applications of Op- amp as.
(i) Difference amplifier (ii) Instrumentation amplifier. | [15M] |
| 4 | a) Draw a stable multi vibrator by using 555 timer and explain its operation. | [8M] |
| | b) Draw the block diagram of PLL and explain its operation. | [7M] |
| 5 | Draw and explain the following ADCs.
(i) Parallel comparator type ADC (ii) Counter type ADC. | [15M] |
| 6 | a) Explain the Design and Analysis procedures of 32×1 multiplexer by using two 16×1 multiplexers. | [8M] |
| | b) Explain about the Code converters with one example. | [7M] |
| 7 | a) What is meant by Shift Registers? Explain the different modes of Operation of Shift registers. | [8M] |
| | b) Draw the Ring counter and explain its operation. | [7M] |
| 8 | a) Draw the internal structure of dynamic RAM and explain its operation. | [8M] |
| | b) Explain the differences between SRAM and DRAM. | [7M] |



Code No: **R31036**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, October/November - 2016

METAL CUTTING & MACHINE TOOLS

(Mechanical Engineering)

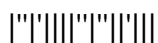
Time: 3 hours

Max. Marks: 75

**Answer any FIVE Questions
All Questions carry equal marks**

- 1 a) Why are chip breakers used? [8M]
b) What is the effect of cutting speed, depth of cut and feed rate on the force on cutting tool? [7M]
- 2 Explain briefly the following lathe operations:- [15M]
i) Threading (ii) Knurling (iii) Forming iv) Taper turning v) Facing
- 3 a) What is the principle of working of planer? [6M]
b) State the advantages, limitations and applications of planer. [9M]
- 4 Discuss in detail the following with neat sketches:- [15M]
(i) Radial drilling machine (ii) Jig boring machine
- 5 Explain briefly with neat sketches:- [15M]
(i) Face milling (ii) Dove-tail milling (iii) Straddle milling
- 6 a) How is grinding ratio defined? [3M]
b) Discuss in detail with neat sketch about external cylindrical grinding. [12M]
- 7 a) How are jigs and fixtures classified? [5M]
b) What is meant by 3-2-1 principle? Explain. [10M]
- 8 a) What do you understand by CNC controller? [4M]
b) Discuss about types of motion controls in CNC machines. [11M]

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Code No: R31046

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, October/November - 2016

DIGITAL COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions

All Questions carry equal marks

- 1 a) A telephone signal band limited to 4 KHZ is to be transmitted by PCM. The signal to quantization noise power ratio is to be at least 40db. Find the number of levels in to which the signal has to be. Also find the transmission Band Width. [8M]
b) What is the Significance of Companding? Explain Companding in PCM systems. [7M]
- 2 a) Obtain the expression for signal to quantization noise power ratio in the casa of DM. [8M]
b) List out the comparisons of PCM and DM systems. [7M]
- 3 a) Explain the concept of M-ary Keying in detail. [8M]
b) A binary data is transmitted using ASK over a AWGN cannel at a rate of 2.4 Mbps. The carrier amplitude at the receiver is 1 micro volt, Noise spectral density is 10^{-15} w/Hz. Find the average probability of error if the detection is coherent. [7M]
- 4 a) Explain the working of Coherent and non coherent PSK. [8M]
b) Find the average probability of error of BFSK and explain its operation. [7M]
- 5 a) Explain the following terms in detail: [8M]
(i) Entropy (ii) Binary symmetric channel (iii) Channel Capacity
(iv) Discrete messages.
b) Define Mutual information. Prove $I(X,Y) = H(X) - H(X/Y)$. [7M]
- 6 a) Apply Shanon-Fano coding to the source with 8 emitting messages having probabilities $\frac{1}{2}, \frac{3}{20}, \frac{3}{20}, \frac{2}{25}, \frac{2}{25}, \frac{1}{50}, \frac{1}{100}$ and $\frac{1}{100}$ respectively, and find the3 coding efficiency. [8M]
b) Explain the Huttman coding in detail along with example. [7M]
- 7 a) What is CRC? If the generating polynomial for CRC code is x^4+x^3+1 and message word is 11110000, determine check bits and codeword. [8M]
b) Explain the procedure of Binary cyclic codes with one example. [7M]
- 8 a) Explain the significance of Trellis structure in detail. [7M]
b) Explain the decoding process using viterbi algorithm. [8M]

