R13

III B. Tech I Semester Supplementary Examinations, October/November -2018
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**

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PART –A

1	a)	Explain the compaction curve.	[4M]
	b)	Draw the gradation curves separately of a well graded soil and gap graded soil.	[4M]
	c)	Explain quick sand condition.	[3M]
	d)	What is the purpose of a Newmark's chart?	[4M]
	e)	Write the relationship between the time factor and degree of consolidation, when the degree of consolidation is greater than 60%?	[4M]
	f)	How is the torque determined in a vane shear test?	[3M]

PART -B

2 a) Write a note on clay minerals. [6M]

b) The moist unit weight of a soil is $16.50 kN/m^3$. Given that the water content= 15% and specific gravity of soil solids = 2.70, find the dry unit weight, porosity, degree of saturation the mass of water that must be added to reach full saturation. [10M]

3 a) Explain the consistency limits. [6M]

b) A certain soil has 99% by weight finer than 1.0mm, 80% finer than 0.10mm, 25% finer than 0.01mm, 8% finer than 0.001mm. Sketch the grain-size distribution curve and determine the percentage of sand, silt and clay fractions as per IS nomenclature. [10M]

4 a) What are the characteristics and uses of flow nets? [8M]

b) The discharge of water collected from a constant head permeameter in a period of 15 minutes is 400ml. The internal diameter of the permeameter is 6.0cm and the measured difference in heads between the two gauging points 15.0cm apart is 40.0cm. Calculate the coefficient of permeability? [8M]

5 a) Explain in detail the construction of Newmark's chart with an influence value of 0.002. [8M]

b) A ring foundation is of 3.0 m external diameter and 2.0 m internal diameter. It transmits a uniform pressure of $90.0 kN/m^2$. Calculate the vertical stress at a depth of 1.50 m directly beneath the centre of the loaded area. [8M]

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6 a) Define pre consolidation pressure. Describe a suitable procedure for determining the pre consolidation pressure.   [8M]

   b) A clay layer 5.0m thick has double drainage. It was consolidated under a load of 127.50kN/m^2. The load is increased to 197.50kN/m^2. The coefficient of volume compressibility is 5.79 x 10^{-4} m^2/kN and value of k = 1.60 x 10^{-8} m/min. If the test sample is 2cm thick and attains 100% consolidation in 24 hours, what is the time taken for 100% consolidation in the actual layer?   [8M]

7 a) Explain the shear characteristics of sand and normally loaded clays?   [8M]

   b) The following results were obtained from a direct shear test on a sandy clay sample.   [8M]

Normal load (N)	Shear load providing ring reading (division)
360	13
720	19
1080	26
1440	26

If the shear box is 60 mm square and the proving ring constant is 20 N 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 320 kN/m^2 and the corresponding shear stress is 138 kN/m^2?

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Code No: RT31021

R13

SET - 1

III B. Tech I Semester Supplementary Examinations, October/November -2018
ELECTRICAL MEASUREMENTS
(Electrical and Electronics 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**

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PART –A

1	a)	List out the errors in Ammeters and Voltmeters. Write the importance of swamping resistance.	[4M]
	b)	List out the parts of the operating mechanism of single phase induction type energy meter.	[3M]
	c)	List out the applications of AC potentiometers.	[3M]
	d)	List out the advantages and disadvantages of Maxwell's bridge	[4M]
	e)	What are the components of power loss that occur in ferromagnetic materials when subjected to alternating magnetic fields?	[4M]
	f)	What are the advantages of a Digital voltmeter?	[4M]

PART -B

2	a)	Derive the necessary torque equation of PMMC instruments and explain in brief the effect of temperature changes in Ammeters.	[5M]
	b)	Enumerate the advantages of MI instruments.	[5M]
	c)	A potential transformer, ratio 1000/100 volt, has the following constants: primary resistance = 94.5Ω, secondary resistance = 0.86Ω, primary reactance = 66.2Ω, total equivalent reactance = 110Ω, no-load current = 0.02A at 0.4 power factor. Calculate i) phase angle error at no load. ii) burden in VA at unity power factor at which the phase angle will be zero.	[6M]
3	a)	Explain the theory and shape of scale of electrodynamometer wattmeters.	[6M]
	b)	A dynamometer type of wattmeter is rated 10 A and 100 V with a full scale reading of 1000 W. The inductance of the voltage circuit is 5 mH and its resistance is 3000 Ω. If the voltage drop across the current coil of the wattmeter is negligible, what is the error in the wattmeter at the rated VA rating with zero power factor? Assume frequency is 50 Hz.	[5M]
	c)	Write the working principle of Weston type synchroscope.	[5M]
4	a)	Explain the term standardization and describe the procedure of standardization for a DC potentiometer.	[8M]
	b)	A coordinate type potentiometer is used for the determination of a coil and the results obtained are: Voltage across a 1.0Ω resistor in series with the coil is +0.238V on in-phase dial and -0.085V on quadratic dial. Voltage across a 10:1 potential divider used with the coil is +0.3375V on in-phase dial and +0.232V on quadratic dial. Calculate the resistance and reactance of the coil.	[8M]

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5 a) Describe the working of hay's bridge for measurement of inductance. Derive the equations for balance condition   [8M]

   b) What are the difficulties encountered in the measurement of High resistances   [3M]

   c) The four arms of a bridge are: [5M]
       arm ab: an imperfect capacitor C_1 with an equivalent series resistor of r_1.
       arm bc: a non-inductive resistance R_3.
       arm cd: a non-inductive resistance R_4.
       arm da: an imperfect capacitor C_2 with an equivalent series resistance of r2 series with a resistance R_2.
       A supply of 450 Hz is given between terminals a and c and the detector is connected between b and d. At balance: $R_2=4.8\Omega$, $R_3=2000\Omega$, $R_4=2850\Omega$ and $C_2=0.5\mu F$ and $r_2=0.4\Omega$. Calculate the value of C_1 and r_1 and also the dissipating factor for this capacitor.

6 a) Explain the procedure to measure leakage factor using flux meter with necessary sketches.   [8M]

   b) Explain the operation of Ballistic Galvanometer with a neat diagram.   [8M]

7   Explain about the following   [16M]
       i) Measurement of frequency
       ii) Digital Multimeter.

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III B. Tech I Semester Supplementary Examinations, October/November - 2018
DYNAMICS OF MACHINERY
(Common to Mechanical Engineering and Automobile 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**
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PART –A

1	a)	Write the effect of precession motion on the stability of moving vehicles?	[4M]
	b)	Classify the types of dynamometers?	[4M]
	c)	Explain the need for Dynamic force analysis	[3M]
	d)	Write about hunting?	[4M]
	e)	What for balancing of rotating masses are required	[4M]
	f)	Explain the necessity of forced damped vibration	[3M]

PART -B

2   a)   Explain in what way the gyroscopic couple effects the motion of an aircraft while taking a turn.   [6M]

b)   The moment of inertia of a pair of locomotive driving wheels with the axle is 200 kg.m^2. The distance between the wheel centers is 1.6 m and the diameter of the wheel treads is 1.8 m. Due to defective ballasting, one wheel falls by 5 mm and raises again in a total time of 0.12 seconds while the locomotive travels on a level track at 100 km/h. assuming that the displacement of the wheel takes place with simple harmonic motion, determine the gyroscopic couple produced and the reaction between the wheel and rail due to this couple.   [10M]

3   a)   A simple band brake is operated by a lever of length 450 mm. The brake drum has a diameter of 600 mm, and the brake band embraces 5/8th 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 120 mm from the fulcrum. The effort applied to the end of the lever is 2 kN, and the coefficient of friction is 0.30. Find the maximum braking torque on the drum.   [10M]

b)   Explain about epicyclic train dynamometer with neat diagram?   [6M]

4   The turning moment requirement of a machine is represented by the equation T = (1000+500 sin 2θ-300cos 2θ) N-m. Where θ is the angle turned by the crankshaft of the machine? If the supply torque is constant, determine: [16M]
i) The moment of inertia by the flywheel. The total fluctuation of speed is not to exceed one percent of the mean speed of 300 rpm.
ii) Angular acceleration of the flywheel when the crankshaft has turned through 45^0 from the beginning of the cycle.
iii) The power required to drive the machine.

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5   The arms of a Hartnell governor are of equal length. When the sleeve is in the mid-   [16M]
     position, the masses rotate in a circle of diameter 200mm (the arms are vertical in
     the mid-position). Neglecting friction, the equilibrium speed for this position is 300
     rpm. Maximum variation of speed, taking friction into account, is to be $\pm$ 5% of the
     mid-position speed for a maximum sleeve / movement of 25 mm. The sleeve mass is
     5 kg and the friction at the sleeve is 30 N.Assuming that the power of the governor
     is sufficient to overcome the friction by 1 % change of speed on each side of the
     mid-position, find (neglecting obliquity effect of arms).
     i) The mass of each rotating ball
     ii) The spring stiffness
     iii) The initial compression of the spring

6   A single cylinder horizontal engine runs at 120 r.p.m. The length of stroke is 400   [16M]
     mm. The mass of the revolving parts assumed concentrated at the crank pin is 100
     kg and mass of reciprocating parts is 150 kg. Determine the magnitude of the
     balancing mass required to be placed opposite to the crank at a radius of 150mm
     which is equivalent to all the revolving and 2/3 rd of the reciprocating masses. If the
     crank turns 300 from the inner dead centre, find the magnitude of the unbalanced
     force due to the balancing mass.

7   a) Derive an equation for the natural frequency of free transverse vibration of a shaft   [7M]
         headed with a number of concentrated loads, by energy method.
     b) A shaft of 10 cm diameter and 100 cm long is fixed at one end and other end carries   [9M]
         a flywheel of mass 80 kg. Taking young's modulus for the shaft material as 2×10^6
         kg/cm^2, find the natural frequency of longitudinal and transverse vibrations.

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III B. Tech I Semester Supplementary Examinations, October/November- 2018
PULSE AND DIGITAL CIRCUITS
(Common to Electronics and Computer Engineering and Electronics and Instrumentation 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**
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PART –A

1	a)	Briefly discuss about the ringing circuits?	[3M]
	b)	What are the applications of voltage comparator?	[4M]
	c)	State the logic levels for typical CMOS logic circuits?	[4M]
	d)	What is the significance of collector catching diodes	[4M]
	e)	List the methods of generating a time base waveform?	[3M]
	f)	Compare sine wave synchronization with pulse synchronization?	[4M]

PART -B

2	a)	Derive the expression for the response of an RC integrator circuit when its input is ramp.	[8M]
	b)	What is the ratio of the rise time of the three sections in cascade to the rise time of single section of a low pass RC circuit?	[8M]
3	a)	State and explain clamping circuit theorem. Discuss about the practical clamping circuit with suitable sketches.	[8M]
	b)	Draw a clipper circuit diagram which can clip the applied sinusoidal signal on positive and negative sides of the waveform. The condition is that the circuit should not contain any dc power supplies. Explain the circuit operation with suitable input and output waveforms. Also draw its transfer characteristics.	[8M]
4	a)	Define rise time, storage time, fall time, and turn off time in the case of transistor as a switch with suitable waveforms.	[8M]
	b)	Compare CMOS, TTL and ECL with reference to logic levels, D.C noise margin, Propagation delay and fan-out?	[8M]
5	a)	What is Schmitt trigger? With the help of a neat circuit diagram and waveforms, explain the working of Schmitt trigger?	[8M]
	b)	Explain the method of unsymmetrical triggering of the binary with relevant circuit diagram.	[8M]
6	a)	With the help of circuit diagram, explain the principle of operation of a constant current sweep circuit.	[8M]
	b)	List the three errors that occur in a sweep circuit and obtain the expression for these errors for an exponential sweep circuit.	[8M]
7	a)	What do you mean by a relaxation circuit? Give a few examples of relaxation circuits.	[8M]
	b)	Illustrate with neat circuit diagram, the operation of unidirectional sampling gate for multiple inputs.	[8M]

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III B. Tech I Semester Supplementary Examinations, October/November - 2018
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**

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PART –A

1	a)	Write the regular definition and transition diagram for identifiers and reserved words.	[3M]
	b)	Differentiate Parse tree and Syntax tree with an example.	[4M]
	c)	What is the significance of Operator precedence	[4M]
	d)	What is semantic rule? How to evaluate the semantic rules?	[4M]
	e)	Write a short note on peephole optimization.	[4M]
	f)	What is strength reduction? Give an example.	[3M]

PART -B

2	a)	Explain the role of assembler, compiler, loader and linker in the language processing system.	[8M]
	b)	Write about the following with respect to lexical analyzer. i) Relationship with regular expressions and regular definitions ii) Lexical errors.	[8M]
3	a)	Explain the structure of predictive parser. How to handle error in it?	[6M]
	b)	Construct the non recursive predictive parse table for the given grammar and check the acceptance of input string **abfcg** S→A A→aB/Ad B→bBC/f C→cg	[10M]
4	a)	Explain the working principle of CLR(1) parser and construct the parse table for the given grammar S→ L=R/R R→ L L→ *R/id	[10M]
	b)	Using the CLR (1) table constructed above check the acceptance of input string id**=id/id** and also explain the algorithm for this.	[6M]
5	a)	What is intermediate code? Translate the expression **(a+b)/(c+d)*(a+b/c)-d** into quadruples, triples and indirect triples.	[8M]
	b)	Write and explain the Syntax Directed definition for the grammar E→ E1+T/E1-T/T T→(E)/id/num.	[8M]
6	a)	Consider the C program and generate the code and Write different object code forms Main() { int i, a[10]; while (i<=10) a[i]=i*5; }	[8M]
	b)	What is Activation Record? Explain its usage in stack allocation strategy. How it is different from heap allocation?	[8M]
7		Explain the following machine independent optimization techniques.	
	a)	Common sub expression and dead code elimination	[6M]
	b)	Copy propagation, constant folding.	[5M]
	c)	Instruction scheduling.	[5M]

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