

III B. Tech I Semester Regular Examinations, November - 2015
ENGINEERING GEOLOGY
(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) Write a detailed note on physical weathering. [3M]
- b) What is metamorphic rock? Discuss the various agents of metamorphism. [4M]
- c) Discuss the effect of faulting on various engineering projects. [4M]
- d) How are earthquakes classified? Explain their causes. [3M]
- e) Describe the electrical resistivity method of site investigation. [4M]
- f) Give an account of geological investigation of Dam site. [4M]

PART -B

- 2 a) Write a note on geological work of river. [4M]
- b) Give a brief account of the importance of geology in civil engineering. Explain your answer by giving suitable example. [8M]
- c) Define weathering. Add a note on engineering importance. [4M]
- 3 a) Explain physical properties of Quartz mineral. [3M]
- b) Explain how are the sedimentary rocks formed? Describe the various structures present in the rocks. [8M]
- c) Define the following terms: [5M]
i) Hardness, ii) Luster, iii) Fracture, iv) Cleavage.
- 4 a) Explain, with neat sketches, the principal types of Faults as recognized on the basis of apparent movement and mode of occurrence. [8M]
- b) How are folds classified? Describe different types of folds. [8M]
- 5 a) Explain the following: i) Aquifer, ii) Aquiclude and iii) Hydrological cycle. [8M]
- b) Effects enumerate the classification and causes of landslides. [8M]
- 6 a) Write the importance of seismic refraction methods in civil engineering. [8M]
- b) Describe the importance of Electrical Resistivity studies in civil engineering. [8M]
- 7 a) Discuss the influence of structural attitudes of sedimentary rocks on dam stability. [8M]
- b) Explain the influence of geological structures, water table, and scope for preventive leakage for successful reservoir. [8M]



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PART -A

- | | | |
|------|--|------|
| 1 a) | River sorting of sediments. | [3M] |
| b) | What do you understand by minerals? How minerals are formed? | [4M] |
| c) | Describe the different types of unconformities and discuss the criteria for their recognition. | [4M] |
| d) | Write notes on prevention, control and correction of landslides. | [3M] |
| e) | Explain the necessities & importance of geophysical investigation. | [4M] |
| f) | Explain the construction of a Gravity Dam? | [4M] |

PART -B

- | | | |
|------|--|------|
| 2 a) | Briefly explain the different types of physical and chemical weathering. | [4M] |
| b) | Explain in detail the geological work of Rivers | [8M] |
| c) | Discuss how geological studies can be utilized in civil engineering projects. | [4M] |
| 3 a) | Differentiate between Gneiss and Schist. | [3M] |
| b) | Explain important physical properties of minerals that are commonly studied for their identification. | [8M] |
| c) | Explain the importance of:
i) Granite, ii) Quartzite iii) Shale, iv) slate and v) Schist. | [5M] |
| 4 a) | How folds are classified? Explain with the help of neat sketch important types of folds as distinguished on the basis of a mode of occurrence. | [8M] |
| b) | Geological structures and their significance in civil engineering projects. | [8M] |
| 5 a) | Define ground water and hydrological cycle. Also explain water table and aquifers and its types. | [8M] |
| b) | Explain Earthquake magnitude, Earthquake Intensity, Earthquake focus and Earthquake tening. | [8M] |
| 6 a) | What are the principles of geophysical exploration? Discuss any one method used for interpreting subsurface structures. | [8M] |
| b) | Comment on seismic exploration techniques for site investigation in civil engineering projects and for water exploration. | [8M] |
| 7 a) | Explain with neat diagram favorable and unfavorable dips at a Tunnel site. | [8M] |
| b) | What is a dam? With what purposes it will be constructed? Explain in detail the geological investigations of a good dam site. | [8M] |

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PART -A

- 1 a) What is a river capture? Explain how it occurs. [3M]
- b) Explain physical properties of Calcite mineral. [4M]
- c) What is the difference between a normal and reverse fault? Explain with neat diagrams. [4M]
- d) What are different causes of Earthquakes? [3M]
- e) Explain the factors and methods of gravity. [4M]
- f) Tunneling in horizontal and folded rocks. [4M]

PART -B

- 2 a) Discuss three important adverse geological conditions that would require remediation during construction of buildings. [4M]
- b) Define weathering. Explain types of weathering and add a note on its importance. [8M]
- c) Define river and river system. Give a detail geological work of rivers. [4M]
- 3 a) Define cleavage and fracture of a mineral with examples. [3M]
- b) Describe following Rock properties in detail: (i) Basalt, (ii) Marble, (iii) Phyllite, (iv) Lime stone. [8M]
- c) Write notes on texture and Structures of metamorphic Rocks? Explain with a neat diagram. [5M]
- 4 a) Explain the following with neat sketches: (i) Dip and strike (ii) Parts of fold (iii) Mural Joints. (iv) Dome and Basin. [8M]
- b) Write short notes on the following with neat sketches: (i) Fan fold (ii) Columnar joints (iii) Angular unconformities and (iv) Radial faults. [8M]
- 5 a) Describe the Water Table and types of Ground Water. [8M]
- b) What are landslides? Discuss briefly their types, causes and preventive measures. [8M]
- 6 a) Write the importance of seismic refraction methods in civil engineering. [8M]
- b) Explain the principles used in the electrical resistivity and electrical SP methods of geophysical exploration. [8M]
- 7 a) Discuss the geological investigations that are carried out for Dam site selection. [8M]
- b) What are Dams and Reservoirs? Discuss the different types of dams giving geological reasons. [8M]

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PART -A

- 1 a) Distinguish between weathering and erosion. [3M]
- b) What is the difference between a batholiths and a stock? Explain with neat diagrams. [4M]
- c) Explain the following terms with neat sketches: i) Foot wall and Hanging wall and ii) Throw and Heave [4M]
- d) Discuss the following terms: (i) Focus and Epicentre, (ii) P- waves and S-waves. [3M]
- e) Describe seismic refraction survey to be conducted for determining the depth of bed rock. [4M]
- f) Explain silting of reservoir and its control. [4M]

PART -B

- 2 a) Explain the Branches of Geology? [4M]
- b) Describe in detail, the process of weathering of rocks. Add a note on the effect of weathering on the strength of rocks. [8M]
- c) Explain the role of geology in the field of civil engineering. [4M]
- 3 a) Bring out the differences between muscovite and biotite. [3M]
- b) Explain the engineering properties and description of Granite, Shale, Marble and Slate. [8M]
- c) Give a detailed account of the chemical composition, physical properties, origin, and uses of Feldspar group minerals. [5M]
- 4 a) Explain the following with neat sketches: (i) Open and closed folds, (ii) Graded Bedding, (iii) Current Bedding and (iv) Anticline and syncline. [8M]
- b) What are the reasons for folding? Discuss how a recumbent fold differs from a monocline fold and illustrate your answers with the help of neat sketches. [8M]
- 5 a) Enumerate the classification and causes of earthquakes and give their safety measures for construction of building in earthquakes prone areas. [8M]
- b) Classify landslides and discuss about the causative factors of landslides. Also, add a note on the measures for mitigation of landslides. [8M]
- 6 a) Give a detailed account of seismic surveys and interpretation of seismic data for subsurface investigation. [8M]
- b) Elaborate on the electrical methods used for sub-surface investigations. [8M]
- 7 a) Explain how faults and folds affect the choice of locations for dams and tunnels. [8M]
- b) Explain in detail about the role of geology on the design and construction of Reservoirs. [8M]

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III B. Tech I Semester Regular Examinations, November - 2015
ELECTRICAL MACHINES – III
 (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**

PART -A

- 1 a) Can AC series motor be started on no-load? Explain. [3M]
 b) Define Pitch factor of a synchronous machine. [4M]
 c) Define voltage regulation. [3M]
 d) What are the advantages of load sharing? [4M]
 e) What is the difference between a synchronous motor and an induction motor? [4M]
 Explain.
 f) List different methods for starting of synchronous motors. [4M]

PART -B

- 2 a) Briefly explain the term rotor frequency. [4M]
 b) Explain the working principle of a single phase induction motor. [8M]
 c) Explain the need for a winding in a split phase induction motor. [4M]
- 3 a) Describe various types of A.C. generators indicating their applications. [3M]
 b) Explain the principle of operation of a synchronous machine. [8M]
 c) A 16 pole alternator has 144 slots. If the coil pitch is kept 5 slots, then calculate its pitch factor. [5M]
- 4 a) Develop a solution for regulation of a salient pole synchronous generator. [8M]
 b) A 550V, 55kVA, 1-Phase alternator has an effective resistance of 0.2Ω . A field current of 10 A produces an armature current of 200 A on short-circuit and an electromotive force of 450 V on open circuit. Calculate the full load regulation with 0.8 power factor lagging. [8M]
- 5 a) Explain the role of synchronous generators operation when connected to an infinite bus. [8M]
 b) Deduce an expression for the synchronizing torque on no load of a 3-phase synchronous machine in terms of the line voltage V, the short circuit line current I_{sc} , the electrical angle of displacement θ and the speed n in rev per sec. [8M]



- 6 a) Analyze the performance of synchronous motor for development of torque. [8M]
b) A 1000 h.p., 6000V, 3 phase star connected synchronous motor has a synchronous impedance of $1.5 + j16 \Omega$ per phase. It is excited to develop an open circuit electromotive force of 5000V. Draw the locus diagram of the current for loads upto 1250 h.p., with constant excitation. Determine the maximum value of the power factor. [8M]
- 7 a) Explain the working of a synchronous -induction motor. [8M]
b) What is hunting and how it can be suppressed? [8M]



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PART -A

- 1 a) What is slip of Induction Motor? [3M]
 b) What factors affect the size of alternator? [4M]
 c) What is potier reactance? [3M]
 d) Define autosynchronization. [4M]
 e) What is pony motor? [4M]
 f) Explain the phenomenon of hunting. [4M]

PART -B

- 2 a) Briefly explain about induced e.m.f of rotor in a induction machine. [4M]
 b) Explain the constructional features of a single phase induction machine. [8M]
 c) What are the drawbacks of A.C. Series motor? Explain. [4M]
- 3 a) What is distribution factor? [3M]
 b) Discuss the effect of armature reaction in an alternator. [8M]
 c) Determine the frequency of a 8 pole alternator rotating at 375 R.P.M. If the no. of poles is doubled, then what will be its new frequency? [5M]
- 4 a) Explain two reaction analysis of salient pole machines with phasor diagram. [8M]
 b) Determine the voltage regulation of a 2000V, 1-phase alternator giving a current of 100A at unity power factor. From the synchronous impedance method test results, full load current is 100A and is produced by a short circuit by a field excitation of 2.5 A and an electromotive force of 500V is produced on open circuit by the same excitation. The armature resistance is 0.8 Ohm. [8M]
- 5 a) What is synchronizing power and explain its role in load sharing during parallel operation? [8M]
 b) Calculate the maximum load of a 5000 kVA, 1 phase alternator having an equivalent reactance of 5 ohm when connected to 6600 V bus bars, if its excitation is such that the electromotive force on open circuit would be 6000V. Find the armature current and power factor at this load. [8M]



- 6 a) What is a synchronous condenser? Explain its operation. [8M]
- b) The input to an 11000V , 3 phase star connected synchronous motor is 60A. The effective resistance and synchronous reactance per phase are respectively 1Ω and 30Ω . Find the power supplied to the motor, and the induced electromotive force for a power factor of 0.8 i) lagging ii) leading [8M]
- 7 a) What could be the reasons for failure in starting a synchronous motor? Suggest different remedies. [8M]
- b) What is hunting? Why is it essential to suppress hunting? Explain. [8M]



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PART -A

- 1 a) Explain double revolving field theory. [3M]
- b) Discuss the advantages of rotating field type alternators. [4M]
- c) Compare between E.M.F. method and Potier Method. [3M]
- d) What is the effect of changing input for alternators operating in parallel? [4M]
- e) What is damper winding? What is its need? [4M]
- f) Justify how synchronous Induction motor can produce high starting torque and constant speed. [4M]

PART -B

- 2 a) What is rotor reactance in an induction machine? Explain. [4M]
- b) What are different types of single phase motors and what are their applications? [8M]
- c) What are applications of AC series motors? [4M]
- 3 a) What is armature reaction? [3M]
- b) Explain the load characteristics of an alternator. [8M]
- c) Determine the frequency of a 12 pole alternator rotating at 600 R.P.M. If the no. of poles is tripled, then what will be its new frequency? [5M]
- 4 a) Explain the merits and demerits of e.m.f and m.m.f methods. Explain the assumptions made in each case. [8M]
- b) A 3phase star connected alternator is rated at 1600 kVA, 13500 V. The armature effective resistance and synchronous reactance are 1.5 Ohm and 30 Ohm respectively per phase. Calculate the percentage regulation for a load of 1280 kW at power factor of 0.8 leading. [8M]



- 5 a) What are the conditions to be fulfilled for running two generators in parallel? [8M]
Describe methods of synchronizing two 3 phase alternators.
- b) Two identical 3 phase star connected generators operating in parallel, share equally [8M]
a total load of 750KW at 6000V and power factor 0.8. The synchronous reactance
and resistance of each machine are respectively 50 Ohm and 2.5 Ohm respectively
per phase. The field of the first generator is excited so that the armature current is
40A (lagging). Find i) armature current of second alternator, ii) power factor of each
machine.
- 6 a) Show that the locus of power of a synchronous machine is circle? Give the [8M]
coordinates of the power circle.
- b) A 2000V, 3 Phase star-connected synchronous motor has an effective resistance and [8M]
synchronous reactance of 0.2 ohm and 2.2 ohm per phase respectively. The input is
800 kW at normal voltage and the induced line electromotive force is 2500V.
Calculate the line current and power factor.
- 7 a) Write short notes on methods of starting a synchronous motor. [8M]
- b) Write short notes on synchronous induction motor. [8M]



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PART -A

- | | | |
|---|---|------|
| 1 | a) Why single phase induction motors are not self starting? | [3M] |
| | b) Define distribution factor. | [4M] |
| | c) Compare between M.M.F. method and Potier Method | [3M] |
| | d) Describe the effect of sudden short circuit on the performance of synchronous generator? | [4M] |
| | e) What is pull out torque of a synchronous motor? | [4M] |
| | f) How does a synchronous induction motor run initially? Explain? | [4M] |

PART -B

- | | | |
|---|--|------|
| 2 | a) List different types of single phase induction motors. Also mention their applications. | [4M] |
| | b) Explain the construction and working of a shaded pole induction motor. | [8M] |
| | c) Explain double revolving field theory. | [4M] |
| 3 | a) Define synchronous reactance. | [3M] |
| | b) Explain de-magnetizing, cross magnetizing and magnetizing nature of armature reaction | [8M] |
| | c) Determine the frequency of a 8 pole alternator rotating at 400 R.P.M. If the number of poles is doubled, then what will be its new frequency? | [5M] |
| 4 | a) Describe the method of finding synchronous impedance of a given alternator. | [8M] |
| | b) A 1500 KVA, 6600V 3 phase star connected alternator with a resistance of 0.4 ohm and reactance of 6 ohm per phase, delivers full load current at power factor 0.8 lagging, and normal rated voltage. Estimate the terminal voltage for the same excitation and load current at 0.8 power factor leading. | [8M] |
| 5 | a) Derive the expression for load sharing between dissimilar alternators. | [8M] |
| | b) Two synchronous generators are connected to bus-bars having a constant voltage of 10000 $\angle 0^\circ$ V. Generator A has an induced e.m.f. of 13000 $\angle 22.6^\circ$ V and a reactance of 2 ohm; generator B has an e.m.f of 12500 $\angle 36.9^\circ$ V and a reactance of 3 ohms. Find the current, KW and KVA _r supplied by each generator. | [8M] |



- 6 a) With the help of a neat vector diagram, explain the operation of synchronous motor as synchronous condenser. [8M]
- b) A 400-V, 6-pole, 3-phase, 50 Hz, star connected synchronous motor has a resistance and synchronous reactance of 0.5 ohm and 4 ohm per phase respectively. It takes a current of 15 A at unity power factor when operating with a certain field current. If the load torque is increased until the line current is 60 A, the field current remaining unchanged, find the gross torque developed, and the new power factor. [8M]
- 7 a) Why synchronous motor is not self starting? Explain various starting methods. [8M]
- b) What is hunting in a synchronous motor? Explain how it can be suppressed. [8M]



III B. Tech I Semester Regular Examinations November - 2015
INSTRUMENTATION & CONTROL SYSTEMS
(Mechanical Engineering)

Time: 3 hours

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

PART -A

- 1 a) What are the different standard inputs for studying the dynamic response of a system? [4M]
- b) What are the desirable properties of thermometric liquid? [4M]
- c) What is the difference between direct and indirect liquid level measuring devices? [4M]
- d) What is the purpose of strain rosette? [3M]
- e) Define the following: [3M]
 - i) humidity ii) dew point temperature iii) wet bulb temperature
- f) What is a servo mechanism? [4M]

PART -B

- 2 a) What are Transducers and how are they classified? Explain their importance in an instrumentation process. [8M]
- b) What are the various errors occur in the measuring instruments and explain the methods of elimination. [8M]
- 3 a) State law of thermocouples. How are the laws useful in construction of thermocouple thermometers? [8M]
- b) Discuss the working of a bourdon tube pressure gauge with relevant sketch and mention merits and demerits. [8M]
- 4 a) Why a rotometer is called variable area flow meter? Sketch and explain its working. [6M]
- b) What factors are to be considered for level measurement sensor selection? [4M]
- c) Explain the construction and working of stroboscope with suitable diagram. [6M]
- 5 a) Explain different methods of temperature compensation in strain gauges. [8M]
- b) Draw a neat sketch and explain the working of unbonded resistance type strain gauge. [8M]
- 6 a) Explain with sketch, the hydraulic dynamometer. [8M]
- b) Describe the working & sling psychrometer used to study the properties of moist air. [8M]
- 7 a) What is closed loop system? Explain the various elements of it with a block diagram. [10M]
- b) Distinguish between open-loop and closed loop control system. [6M]

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PART -A

- 1 a) Define the following: [4M]
i) measurand ii) measurement iii) calibration iv) primary measuring element.
b) Explain the principle on which the bimetallic thermometer works. [4M]
c) Write a short note on magnetic flow meter. [4M]
d) Derive an expression for gauge factor. [3M]
e) How a strain gauge is used for measuring torque? [4M]
f) State the advantages of closed loop systems. [3M]

PART -B

- 2 a) Sketch and explain generalized measurement system and its functional elements. [8M]
b) Explain the difference in principle of operation of photo emissive cell, a photo conductive cell and a photo voltaic cell. [8M]
- 3 a) With the help of neat sketch explain the working of total radiation pyrometer. [8M]
b) Explain the operation of pirani thermal conductivity gauge for pressure measurement with a sketch [8M]
- 4 a) Explain the construction and working of a hot wire anemometer. [7M]
b) How can gamma rays be used to measure liquid level? [5M]
c) Draw the diagram of a piezo electric accelerometer and explain its working. [4M]
- 5 a) What properties are to be considered in selecting materials for strain gauges and explain about strain rosettes? [8M]
b) A rectangular rosette was used to determine the stress situation in a certain experiments and following observations are recorded:
 $\epsilon_1=900\mu\text{m/m}$, $\epsilon_2=300\mu\text{m/m}$, $\epsilon_3= -200\mu\text{m/m}$, determine the principal strains, principal stresses and the location of principal planes. Take $E=200\text{GPa}$, and $\nu=0.3$ [8M]
- 6 a) With the help of neat sketch explain the working of absorption hygrometer. [8M]
b) Explain briefly how a stroboscope is used to measure torque. State its advantages [8M]
- 7 a) Describe with neat sketch the open loop speed control system. [7M]
b) Illustrate with example, explain closed loop temperature control system. [9M]

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PART -A

- | | | |
|---|---|------|
| 1 | a) State the advantages of electrical transducers over other transducers. | [3M] |
| | b) Explain the principle of conversion in bourdon tube pressure gauge. | [4M] |
| | c) How seismic instruments used for measuring acceleration? | [4M] |
| | d) Write the desirable characteristics of bonding materials. | [4M] |
| | e) Explain the basic principle of mechanical torsion meter. | [4M] |
| | f) What are the basic elements of a control system? | [3M] |

PART -B

- | | | |
|---|--|-------|
| 2 | a) Explain various dynamic performance characteristics with sketches. | [6M] |
| | b) With a neat sketch explain the working of LVDT to measure linear displacement | [6M] |
| | c) Describe the principle of operation of a piezo-electric transducer. | [4M] |
| 3 | a) Explain the Mcleod vacuum gauges used for pressure measurement and its limitations | [8M] |
| | b) State the three laws of thermocouples. | [3M] |
| | c) What is a thermistor? How is it used for temperature measurement | [5M] |
| 4 | a) Explain a capacitive liquid level sensor used to measure liquid level. | [7M] |
| | b) Describe the working of a cryogenic fuel level indicator. What are its advantages and disadvantages? | [9M] |
| 5 | a) Why bridge circuit is necessary for a strain gauge? Explain how the bridge circuit is used with a strain gauge. | [10M] |
| | b) How resistive strain gauges are calibrated? | [6M] |
| 6 | a) Sketch and explain the construction and working of a dew point meter. | [8M] |
| | b) Explain the method of measuring force using a pneumatic load cell. | [8M] |
| 7 | a) With a neat sketch explain the position control system. | [8M] |
| | b) What is a servo mechanism? Explain its operation. | [8M] |

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PART -A

- | | | |
|---|---|------|
| 1 | a) Mention important characteristics of a transducer. | [3M] |
| | b) Explain the bellows gauge used to measure gauge pressure. | [4M] |
| | c) State the principle of tachogenerators. | [4M] |
| | d) What is the purpose of providing backing for bonded strain gauges? | [4M] |
| | e) What are load cells? Name the application of load cells. | [3M] |
| | f) Distinguish between open and closed loop system. | [4M] |

PART -B

- | | | |
|---|---|-------|
| 2 | a) Explain various types of errors in measurement system by giving suitable examples. | [8M] |
| | b) Describe the construction and working of capacitive transducer and state its advantages | [8M] |
| 3 | a) What is thermopile? Explain the principle of operation with neat sketch. | [6M] |
| | b) Explain the construction and working of strain gauge pressure cells. | [10M] |
| 4 | a) Explain with a neat sketch how you will measure the fluid velocity by using turbine meter. | [8M] |
| | b) Describe the different methods used for measurement of speed and explain their advantages and disadvantages. | [8M] |
| 5 | a) Classify the bonded strain gauges and explain with neat sketches. | [10M] |
| | b) Describe the tension measurement using strain gauge with neat diagram. | [6M] |
| 6 | a) What is a proving ring? How is it used to measure force? | [5M] |
| | b) With a neat sketch explain how torque can be measured by using strain gauge. | [8M] |
| | c) Define the following :
i) humidity ratio ii) relative humidity iii) wet bulb temperature. | [3M] |
| 7 | a) With the help of block diagram explain how is the water level in a boiler controlled? | [8M] |
| | b) Describe a speed control system for controlling speed of an I.C. engine. | [8M] |

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III B.Tech I Semester Supplementary Examinations, November - 2015**WATER RESOURCES ENGINEERING-I****(Civil Engineering)****Time: 3 hours****Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Define and explain the following terms: [8]
 (i) Catchment area (ii) Runoff and surface runoff (iii) Hydrograph of a storm
 (iv) Yield of a drainage basin (v) Average annual rainfall.
- b) Explain the working of recording rain gauge with a neat sketch. [7]
- 2 a) What do you understand by evapo-transpiration? How is it determined? [7]
- b) In a certain river basin there are four rain gauge stations, with their normal annual precipitations amounting to 800,520,440 and 400 mm, respectively. Determine the optimum number of rain gauges in the catchment, if it is desired to limit the error in the mean value of rainfall in the catchment to 12%. [8]
- 3 a) Explain the method of determining direct run-off from a given storm hydrograph. [7]
- b) What is a current-meter and what are its types? Discuss how can it be used to determine the discharge, (i) in a shallow river, (ii) in a wider river. What formulas are used for computing discharge measurements? [8]
- 4 a) What is meant by 'Design Flood', and what is its importance? [7]
- b) Explain briefly what a unit hydrograph and a distribution graph is? [8]
 Starting from 12 noon, storm rainfalls of 2.5, 7.5 and 5.0 cm occur during three successive hours over a 25 square kilometer area. The storm loss rate (Φ_{index}) is 1.25 cm per hour. The percentages of distribution graph for successive hours are 5,20,40,10 and 5. Estimate the value of peak discharge in cubic metres per second and the hour when it is expected.
- 5 a) Define the following terms : [8]
 Aquifer, Aquiclude, specific yield, piezometric surface, water table, perched aquifer
- b) Design an open well in fine sand to give a discharge of 0.005 cumecs when worked under a depression head of 3 metre. Take the value of the specific yield for fine sand as 0.5m³/hour per square metre of area, under unit depression head. [7]
- 6 a) Discuss in brief various methods of surface irrigation. [7]
- b) What is water logging? What are its ill-effects? [8]



Code No: **R31014**

R10

Set No. 1

- 7 a) Name any two methods used for estimating consumptive use of water for a particular crop at a particular place. Explain in details the one which is most widely used in your region and the reason for preferring that particular method. [8]
- b) A reservoir with a live storage capacity of 300 million cubic metres is able to irrigate an ayacut of 40,000 hectares with fillings each year. The crop season is 120 days. What is the duty? [7]
- 8 a) Explain the procedure of designing a channel with Kennedy's theory. [7]
- b) Using Lacey's theory, design an irrigation channel for the following data : [8]
Discharge $Q = 48$ cumecs
Silt factor $f = 1$
Side slopes = $\frac{1}{2} : 1$.

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Code No: R31024

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, November - 2015

POWER ELECTRONICS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

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

- 1 a) Compare between SCR and IG B T. [6]
b) Draw the V-I characteristics of a thyristor and explain different operating regions. What is the effect of gate current on the V-I characteristics of a thyristor? [9]
- 2 a) What is commutation? What are the types of commutation? Explain any one commutation circuit with a diagram and waveforms. [8]
b) Write short notes on [7]
i) UJT triggering circuit (ii) Synchronised UJT triggering circuit.
- 3 a) Describe the operation of 1-phase, two pulse, mid-point converter with relevant voltage and current waveforms. [9]
b) What are line commutated converters? Explain briefly. [6]
- 4 A single phase fully controlled bridge converter supplies an inductive load. Assuming that the output-current is virtually constant, and is equal to I_d . Determine the following performance measure, if the supply voltage is 230 V and if the firing angle is maintained at $\pi/3$ radians. i) Average output voltage ii) Supply RMS current iii) Supply fundamental RMS current iv) Fundamental PF and v) Supply PF. [15]
- 5 a) What are the advantages of three – phase bridge controlled rectifier over three – phase midpoint six pulse controlled rectifier? [8]
b) A 3-phase half wave controlled rectifier has a supply of 200 V/phase. Determine the average load voltage for firing angle of 0° , 30° , 60° assuming a thyristor volt drop of 1.5 V and continuous load current. [7]
- 6 A single –phase half –wave ac voltage controller is connected with a load of $R = 5 \Omega$ with an input voltage of 230 V, 50 Hz. If the firing angle of thyristor is 45° , determine (a) the RMS output voltage, (b) power delivered to load (c) input power factor and (d) average value of input current and voltage. [15]
- 7 a) Draw the schematic of step-down chopper and derive the expression for output voltage in terms of duty-cycle for step down chopper. [8]
b) A Chopper circuit is operating on TRC principle at a frequency of 1kHz on 220 V d.c. supply. If the load voltage is 180 V, calculate the conducting and blocking period of thyristor in each cycle. [7]
- 8 Draw and explain the simple SCR series inverter circuit. Draw and discuss the important waveforms. State the limitations of this series inverter. [15]



Code No: **R31034**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, November - 2015

THERMAL ENGINEERING-II

(Com.To. ME,AME)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions

All Questions carry equal marks

- 1 a) Show Rankine cycle on P-V and T-S diagram using dry saturated steam and obtain an expression for the Rankine cycle efficiency. [8]
b) Steam at a pressure of 15 bar and at a temperature of 300°C is supplied to a steam turbine working on the Rankine cycle. If the exhaust takes place at 0.15 bar, Evaluate the Rankine efficiency. Calculate the steam consumption in Kg/h to develop 750 KW, if efficiency ratio is 0.6. [7]
- 2 a) Explain the working of super heater with the help of neat sketch. [5]
b) A chimney has a height of 60 meters. The temperature of air is 27°C . Find the draught in mm of water when the temperature of chimney gases is such as to cause the mass of these gases discharged in a given time to be maximum. [10]
- 3 a) Draw the discharge versus ratio of pressures at outlet to inlet curve for a convergent steam nozzle. Discuss the physical significance of critical pressure ratio. [5]
b) The throat diameter of the nozzle is 5mm. If dry and saturated steam at 10 bar is supplied to the nozzle, Calculate the mass flow per second. The exhaust pressure is 1.5 bar. Assume friction less adiabatic flow and index of expansion $n=1.135$. If 10 percent of the isentropic heat drop is lost in friction, what should be the correct diameter at outlet for steam to issue at the same exhaust pressure. [10]
- 4 A De-Laval turbine is supplied with dry steam and works on a pressure range from 10.5 bar to 0.3 bar. The nozzle angle is 20° and the blade exit angle is 30° . The mean blade speed is 270m/s. If there is a 10% loss due to friction in the nozzle and the blade velocity coefficient is 0.82, find the thrust on the shaft per KW power developed. [15]
- 5 In a reaction turbine pair, the fixed and moving blades are of the same shape but reversed in direction. The angles of the receiving tips are 35° and of discharging tip 20° . The mean velocity of the blades is 37.5 m/s and the steam flows at the rate of 64kg/s. If the isentropic heat drop for this turbine pair is 6KJ/kg. Calculate the diagram power and efficiency of the pair. [15]
- 6 a) What are the functions of condenser in a steam plant. [5]
b) The vacuum gauge on a condenser reads 655 mm of Hg at a barometric pressure of 760 mm of Hg. Steam condenses at 48°C . Find the ratio of mass of water vapour (steam) to air to be dealt by dry air pump. If the air leakage into the condenser were reduced by 50%, find the resulting alteration in vacuum in mm of Hg. [10]



- 7 a) Write a short note on semi-closed cycle gas turbine. [5]
- b) A gas turbine takes in air at 27°C and 1 bar. The pressure ratio is 4 and the maximum temperature in the cycle is 560°C . The compressor and turbine efficiencies are 0.83 and 0.85 respectively. Determine the overall efficiency if the regenerator effectiveness is 0.75. [10]
- 8 a) List out the differences between the jet propulsion and rocket propulsion. [5]
- b) The following data pertain to a turbo-jet flying at an altitude of 9500m Speed of the turbo jet=800 km/hr, Propulsive efficiency=55%, Overall efficiency of the turbine plant=17%, Density of air at 9500 m altitude= 0.17 kg/m^3 , Drag on the plane=6100N. Assuming calorific value of the fuels used as 46000KJ/kg. Calculate Absolute velocity of the jet (ii) Volume of air compressed per min (iii) Diameter of the jet (iv) Power output of the unit (v) Air-fuel ratio. [10]

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Code No: R31054

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, November - 2015

COMPUTER GRAPHICS

(Common to CSE & IT)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Why is it preferred to take unit x increment or unit y increment corresponding to slope $m \leq 1$ or slope $m \geq 1$ in Bresenham line drawing algorithm. [7]
b) Using midpoint circle algorithm, generate points on the circle with center (5, 5) and radius 5 units. [8]
- 2 a) Describe inside and outside tests in the context of area filling with suitable examples. [7]
b) Demonstrate with suitable example the failure of boundary fill algorithm to fill the specified area. [8]
- 3 a) Determine a sequence of basic transformations that are equivalent to the x-direction shearing matrix. [7]
b) Explain homogeneous coordinates. [8]
- 4 Derive the window-to-viewport transformation equations by first scaling the window to the size of the viewport and then translating the scaled window to the viewport position. [15]
- 5 a) Develop an algorithm for calculating the normal vector to a Bezier surface at the point $P(u, v)$. [7]
b) Explain different kinds of knot vectors employed in B-spline basis functions. [8]
- 6 Derive the transformation matrix for scaling an object by scaling factor s in a direction defined by the directional angles α, β, γ . [15]
- 7 Write a program that uses the depth-sorting method to display the visible surfaces of any given object with plane faces. [15]
- 8 a) Design a storyboard layout and accompanying key frames for an animation of a single polyhedron. [7]
b) Write a brief note on computer animation functions. [8]

