**Q.P. Code: 257612** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Geo-Technical Engineering -1 (CE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

### UNIT – I

1. (a) What do you understand by residual soils and transported soils? 7M
   (b) A soil has a liquid limit of 25 % and a flow index of 12.5 %. If the plastic limit is 15 %, determine the plasticity index and the toughness index. If the water content of the soil in its natural condition in the field is 20 %, find the liquidity index and the consistency index. 7M

(OR)

2. (a) What is the use of classification of soils? Discuss Indian Standard Classification system. 7M
   (b) A sample of sand has a volume of 1000 ml in its natural state. Its minimum volume when compacted is 840 ml. When gently poured in a measuring cylinder, its maximum volume is 1370 ml. Determine the relative density. 7M

### UNIT – II

3. (a) Derive an expression to out the average permeability of stratified soil? 7M
   (b) A soil profile consists of a surface layer of sand 3.5 m thick ($\gamma$ = 16.5 kN/m$^3$), an intermediate layer of clay 3 m thick ($\gamma$ = 19.0 kN/m$^3$) and the bottom layer of gravel 3.5 m thick ($\gamma$ = 19.25 kN/m$^3$). The water table is at the upper surface of the clay layer. Determine the effective pressure at various levels immediately after placement of a surcharge load of 60 kN/m$^2$ to the ground surface. 7M

(OR)

4. (a) When does quick sand condition occurs in soil? Explain with a neat sketch. 7M
   (b) A homogeneous dam is 21.5 m high and has a free board of 1.5 m. A flow net was constructed and the following results were observed. 7M
   No. of potential drops = 12 and No. of flow channels = 4
   The dam has a horizontal filter of 15 m length. Calculate the discharge/m length of the dam if the coefficient of permeability of the material is 2.7 x 10$^{-6}$ m/sec.

### UNIT – III

5. (a) Explain Westergaard's theory for the determination of the vertical stress at a point. 7M
   (b) A line load of 100 kN/m run extends to a long distance. Determine the intensity of vertical stress at a point 2 m below the surface at a distance of 2 m perpendicular to the line load. Use Boussinesq's theory. 7M

(OR)

6. (a) Describe the method of calculating the stress at a point below the corner of a rectangular load. 7M
   (b) A long strip footing of width 2 m transmits a pressure of 200 kPa to the underlying soil. Compute the value of the vertical stress at a depth of 5 m below the centre of gravity of the footing. 7M

### UNIT – IV

7. (a) How would you decide whether the soil should be compacted the dry of optimum or the wet of optimum? 7M

(b) In a laboratory, the consolidation test was performed on a specimen of clay 3 cm thick. The sample was drained at top and bottom. The time required for 50 % consolidation of the sample was observed to be 15 minutes. Determine the coefficient of consolidation of clay. 7M

Calculate time required for 50 % and 90 % consolidation for this clay deposit in the field 3 m thick and drained at both ends.

(OR)

8. (a) Explain the procedure to determine the coefficient of consolidation using Casagrande's logarithm of time fitting method. 7M

(b) The following are the results of compaction test performed on a soil sample, having G = 2.7 7M

| Water content (%) | 5 | 10 | 14 | 20 | 25 |
|---|---|---|---|---|---|
| Bulk density (g/cc) | 1.77 | 1.98 | 2.10 | 2.18 | 2.16 |

Plot the necessary curve and report the value of O.M.C. and M.D.D. Plot the zero-air voids curve. Find the percent air voids at M.D.D.

**UNIT-V**

9. (a) Explain briefly about the types of shear tests based on drainage conditions. 7M

(b) A cylindrical specimen of a saturated soil fails under an axial stress 150 kN/m$^2$ in an unconfined compression test. The failure plane makes an angle of 52$^o$ with the horizontal. Calculate the cohesion and angle of internal friction of the soil. 7M

(OR)

10. (a) Describe the shear characteristics of cohesive soils. 7M

(b) A standard specimen of cohesionless sand was tested in triaxial compression and the sample failed at a deviator stress of 500 kN/m$^2$, when the cell pressure was 110 kN/m$^2$ under drained condition. Find the effective angle of shearing resistance of sand. What would be the deviator stress and the major principal stress at failure for another identical specimen of sand if it is tested under a cell pressure of 200 kN/m$^2$? 7M

**Q.P. Code: 257812** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Hydraulic Machinery (CE)*

Time : 3 Hours | Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Explain about Buckingham's pi theorem
   (b) Explain about Geometric and kinematic similarities

(OR)

2. (a) Explain any three dimension less numbers
   (b) Find the expression for the power P developed by a pump when P depends upon the head H, the discharge Q and specific weight W of the fluid

**UNIT – II**

3. A jet of water having a velocity of 40m/sec strikes a curved vane, which is moving with a velocity of 20m/sec. The jet makes an angle of 300 with the direction of motion of the vane at inlet and leaves at an angle of $90^0$ to the direction of motion of the vane at outlet. Draw the velocity triangles at inlet and outlet and determine the vane angles at inlet and outlet so that the water enters and leaves the vane without shock.

(OR)

4. (a) Find the expression for force exerted by a jet on 45°at vertical plate moving in the direction of jet.
   (b) A jet of water of diameter 10*cm* strikes a flat plate normally. With a velocity of 15*m/s*.The plate is moving with a velocity of 6*m/s* in the direction of the jet and away from the jet. Find the force exerted by the jet on the plate

**UNIT – III**

5. What is draft tube? What are the functions of draft tube? Explain different types with figures and draft tube theory

(OR)

6. (a) A Pelton wheel has a mean bucket speed of l0 meters per second with a jet of water flowing at the rate of 700 liters/s under a head of 30 metres. The buckets deflect the jet through an angle of $160^0$ calculate the power given by water to the runner and the hydraulic efficiency of the turbine. Assume coefficient of velocity as 0.9g.
   (b) Draw pelton wheel and mention its components.

**UNIT – IV**

7. (a) What do you mean by manometric efficiency, mechanical efficiency and overall efficiency of a centrifugal pump?
   (b) The diameters of an impeller of a centrifugal pump at inlet and outlet are 20 cm and 40 cm respectively. Determine the minimum speed for starting the pump if it works against head of 25m.

(OR)

8. (a) The centrifugal pump having outer diameter equal to two times inner diameter is running at 1000 rpm with working head of 40 m. Velocity of flow is constant and equal to 2.5m/s. The vanes are set back at an angle of $40^0$ at outlet. If outer diameter of Impeilar is 50 cm and the width at outlet is 5 cm. Then determine vane angle at inlet Impeller power and manometric efficiency. Assume waters enter radially at inlet
   (b) Draw characteristic curves for centrifugal pump

**UNIT-V**

9. (a) Explain about single acting and double acting reciprocating pumps
   (b) Explain about slip of reciprocating pumps

(OR)

10. What is reciprocating pump? Describe the principle and working of a reciprocating pump with a neat sketch

**Q.P. Code: 258012** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Building Construction (CE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. What are the important points should be considered while selecting the site for a residential building.

(OR)

2. (a) Enumerate the essentials of a good ventilation system.
   (b) List out the building byelaws for a residential building.

**UNIT – II**

3. (a) Why stone dressing is done before using it in the masonry? Describe the different types of surface finishes employed in stone masonry construction.
   (b) What points should be observed while supervising the brickwork.

(OR)

4. (a) List out the main features of the English bond.
   (b) Define the terms in stone masonry (i) Natural bed (ii) Course (iii) Through stone (iv) Corbel (v) Throating (vi) Lacing course (vii) Ashlar masonry.

**UNIT – III**

5. (a) Describe in detail the methods of construction of a cement concrete floor 40cm thick.
   (b) Define a flat roof and mention its advantages and disadvantages.

(OR)

6. (a) Write short notes on (i) A.C. sheet roof covering (ii) G.I. sheets roof covering.
   (b) What are the different types of arches that are used for engineering construction? Describe any two types in detail with sketches.

**UNIT – IV**

7. (a) What are different types of doors? Give brief use of each door?
   (b) What are the causes and effects of dampness?

(OR)

8. (a) What do you understand by the term of damp proof course? Where it is placed in a building and why? Write short specifications on dam proof course laying to brick masonry walls both in foundation and plinth and super structure.
   (b) Explain the term acoustics.

**UNIT-V**

9. (a) Explain the advantages and disadvantages of an intelligent building.
   (b) Explain the concept of an intelligent building.

(OR)

10. (a) What are the new developments in a green building?
    (b) Explain the concept of a green building.

**Q.P. Code: 258212** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Surveying - II (CE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Explain with a sketch, how to find the elevation of an object, whose base is inaccessible and instrument stations are not in the same plane. 7M

   (b) Find the elevation of the top of church spire 'A' from the following data : 7M

| Inst. at | Sight to | Vertical angle | Remarks |
|---|---|---|---|
| B | A | 25º 23' | Staff reading on B.M =1.350 |
| C | A | 16º 40' | Staff reading on B.M =1.225<br>R.L of B.M = 152.260 m<br>Distance BC = 30m |

(OR)

2. (a) Explain the different types of towers and signals used in triangulation. 7M

   (b) Explain, with sketches, the different triangulation systems. 7M

**UNIT – II**

3. (a) Explain with neat sketch the elements of simple circular curve. 7M

   (b) Two roads meet at an angle of 127° 30'. Calculate the necessary data for setting out a curve of 15 chains radius to connect two straight portions of the road if it is intended to set out the curve by chain and offsets only. Explain carefully how you would set out the curve in the field. Assume the length of chain as 20 m. 7M

(OR)

4. (a) What do you understand by the following forms of the curve and state where they generally used: 7M
   (i) Compound curve, (ii) Transition curve and (iii) Vertical curve

   (b) A vertical curve has an upgrade of 2.5% followed by a down grade of 0.5%. The recommended rate of change of grade is 0.15% per chain of 20 m length. Calculate the length of the vertical curve. 7M

**UNIT – III**

5. (a) Discuss various operations required for conducting a Hydrographic survey. 7M

   (b) Explain any two methods of locating soundings. 7M

(OR)

6. (a) Explain the functions of three segments of GPS. 7M

   (b) Explain about different types of GPS receivers with their functions. 7M

**UNIT – IV**

7. (a) Define and explain the following terms: 7M
   (i) Exposure station, (ii) Tilt Displacement, (iii) Principal point, (iv) Isocentre

   (b) Explain the principles and branches of Photogrammetric surveying. 7M

(OR)

8. (a) Write in detail different types of photographs. 7M

   (b) Define Photo-interpretation. Explain the features that help to identify objects in photograph. 7M

**UNIT-V**

9. (a) Explain features of Total Station? Compare Total Station with Theodolite. 7M

   (b) Explain the steps involved in setting up Total Station for taking observations. 7M

(OR)

10. (a) Explain with a neat sketch how you setting out a layout of a building with total station 7M

    (b) Explain the different sources of errors may occur while using total station, suggest remedial. 7M

**Q.P. Code: 258412** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Mechanics of Materials - I (CE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) State Hook's law. Neatly draw the stress-strain diagram for steel indicating all salient points and zones on it. 7M

   (b) A steel bar ABCD of varying sections is subjected to the axial forces as shown in **fig.1.** Find the value of P necessary for equilibrium, If E = 210 kN/mm$^2$. Determine 7M

   i) Stress in various segments ii) Total elongation of bar

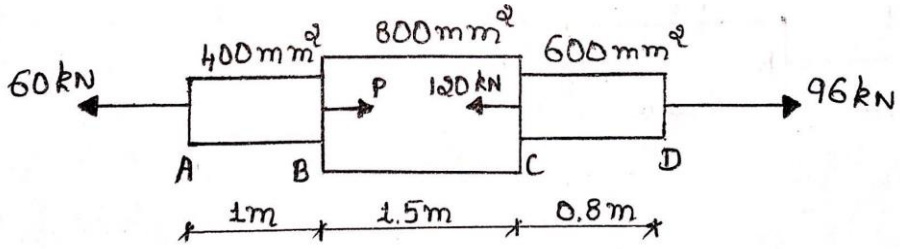


**Fig.1**

(OR)

2. (a) Derive a relationship between Young's modulus 'E' and rigidity modulus 'G'. 8M

   (b) Define the following 6M

   i) Elasticity, ii) Ductility, iii) Toughness, iv) Hardness, v) Stiffness, vi) Resilience

**UNIT – II**

3. (a) Obtain the relation between shear force, bending moment and rate of loading at a section of a beam. 7M

   (b) Draw the shear force and bending moment diagrams for a beam shown in **fig.2** 7M

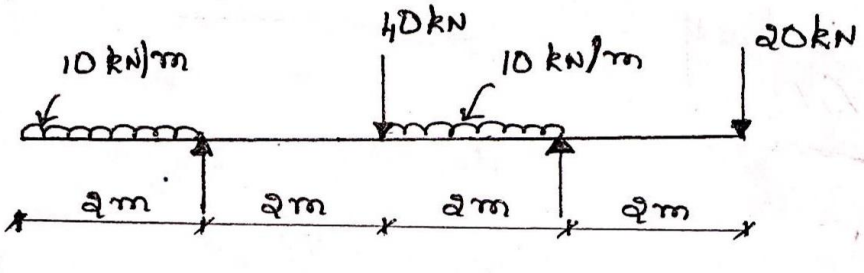


**Fig.2**

(OR)

4. Draw the shear force and bending moment diagrams for a beam shown in **fig.3** 14M

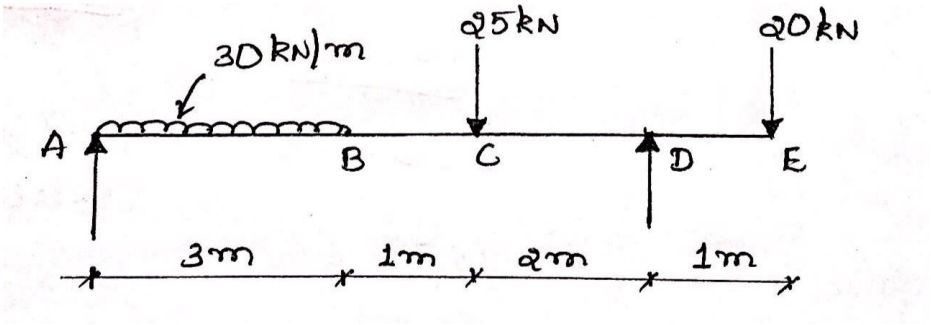


**Fig.3**

**UNIT – III**

5. (a) Derive the equation of bending. (Pure bending equation) 7M

(b) A rectangular beam 200mm and 300mm wide is simply supported over a span of 8m. What uniformly distributed load per meter the beam may carry, if the bending stress is not to exceed 120 N/mm2 7M

(OR)

6. A hollow circular shaft 2m long is required to transmit 1000kW power, when running at a speed of 300 rpm. If the outer diameter of the shaft is 150mm and inner diameter is 120mm. Find the maximum shear stress and strain energy stored in the shaft. 14M

**UNIT – IV**

7. Find slope and deflection at free end for the cantilever beam carrying a point load at free end using conjugate beam method. 14M

(OR)

8. Determine the slope and deflection at the free end of a cantilever beam by moment area method. Take EI = 8000 kN.$m^2$ 14M

**UNIT-V**

9. Derive the equation for torsion. 14M

(OR)

10. A shaft transmits 180kW at 240rpm. The allowable shear stress is 72MPa. 14M
    i) Find the diameter of solid shaft
    ii) Also find the diameter of hollow shaft if the inside diameter is 0.6 times its outside diameter.
    iii) What is the percentage of saving of material if both shafts are of same material and length?

**Q.P. Code: 258612** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Basic Electrical and Electronics Engineering (CE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Define and explain basic circuit elements 7M
   (b) A resistance of R ohm is connected in series with a parallel circuit comprising of two resistors of 12 ohm and 28 ohm respectively. The total power dissipated in the circuit is 70 W when the applied voltage is 20 V. Find the value of R. 7M

(OR)

2. (a) Define and explain KCL & KVL with neat diagram. 7M
   (b) Explain the types of passive elements in detail. 7M

**UNIT – II**

3. (a) Discuss the constructional details of single - phase transformer 7M
   (b) Obtain the expression induced EMF of a transformer. 7M

(OR)

4. (a) Derive the EMF equation of DC generator 7M
   (b) A six-pole, lap wound armature has 840 conductors and flux per pole of 0.018 Wb. Calculate the emf generated, when the machine is running at 600 rpm. 7M

**UNIT – III**

5. Define the regulation of a alternator. Explain how you will determine the regulation of an alternator by using synchronous impedance method with neat circuit diagram. 14M

(OR)

6. (a) Obtain different equivalent Circuits of a PN Junction diode. 7M
   (b) Explain the VI characteristics of PN Junction diode with neat diagrams and explain. What is Static Resistance and Dynamic Resistance? 7M

**UNIT – IV**

7. (a) Draw the circuit diagram of PNP transistor as an amplifier with self bias and explain its working. 7M
   (b) With neat sketch explain the different current components of transistor. 7M

(OR)

8. (a) Draw the circuit diagram of NPN transistor as an amplifier with self bias and explain its working. 7M
   (b) Explain how transistor will act as an amplifier 7M

**UNIT-V**

9. With the help of a block schematic, explain the working of a CRO and what are the applications of CRO. 14M

(OR)

10. Convert the following to Binary. 14M

(a) $(2311)_{16}$ , (b) $(A440)_{16}$ , (c) $(7444)_{8}$ , (d) $(7667)_{8}$ , (e) $(158)_{10}$

**Q.P. Code: 357612** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Power Systems - I (EEE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

| | | | |
|---|---|---|---|
| 1. | (a) | Define the following<br>(i) Load factor, (ii) Demand factor, (iii) Capacity factor, (iv) Utilization factor | 6M |
| | (b) | A generating station has a maximum demand of 500MW. The annual load factor is 50% and capacity factor is 40%. Find the reserve capacity of the plant. | 8M |
| | | (OR) | |
| 2. | (a) | Explain the following<br>(i) Flat rate Tariffs, (ii) Two part Tariffs | 7M |
| | (b) | Explain factors affecting the cost of generation. | 7M |

**UNIT – II**

| | | | |
|---|---|---|---|
| 3. | (a) | Explain about Pin type insulator with neat diagram. | 7M |
| | (b) | A three phase over head transmission line is being supported by three disc insulators. The potential across top unit and middle unit are 9 kV and 11kV respectively. Calculate i) the ratio of capacitance between pin and earth to the self-capacitance of each unit. ii)the line voltage and iii) string efficiency. | 7M |
| | | (OR) | |
| 4. | | Explain the calculation of Sag for equal and unequal heights of towers. | 14M |

**UNIT – III**

| | | | |
|---|---|---|---|
| 5. | (a) | Derive the Inductance of a single phase two wire line. | 7M |
| | (b) | A three phase 80 km long transmission line has its conductors of 1.0 cm diameter spaced at the corners of the equilateral triangle of 100 cm side. Find the inductance per phase of the system. | 7M |
| | | (OR) | |
| 6. | (a) | Derive the Capacitance of a two wire line. | 7M |
| | (b) | Explain the effect of earth on capacitance of line. | 7M |

**UNIT – IV**

| | | | |
|---|---|---|---|
| 7. | | Explain about primary and secondary distribution systems. | 14M |
| | | (OR) | |
| 8. | | State and explain Kelvin's law and also explain its limitations. | 14M |

**UNIT-V**

| | | | |
|---|---|---|---|
| 9. | (a) | Explain about Insulation in Cables. | 7M |
| | (b) | Explain the types of Cables. | 7M |
| | | (OR) | |
| 10. | (a) | Explain the factors affecting Corona. | 7M |
| | (b) | Derive an expression for power loss due to Corona. | 7M |

**Q.P. Code: 357812** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Electrical Machines-II (EEE)*

Time: 3 Hours | Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

### UNIT – I

1. Explain the phasor diagram on load condition? From that derive the voltage regulation for lagging and leading power factors — 14M

(OR)

2. (a) Derive the emf equation of single phase transformer? — 6M
   (b) A 250 kVA, 1- phase, 33000 / 440 V transformer gave the following results in the short circuit test with 200 V applied to the HV side and secondary short circuited, the primary current was full load value and the input power was 5250 W. Calculate the secondary potential difference and the % of regulation when the full load current was Passing at a0.8 p. f. leading with normal primary voltage. — 8M

### UNIT – II

3. (a) Explain the experimental procedure for pre determination of voltage regulation by conducting back to back Test? — 7M
   (b) Explain how to convert a normal transformer to an Auto transformer? — 7M

(OR)

4. (a) Determine the load sharing between two transformers with unequal voltage ratios? — 7M
   (b) Two single phase transformer of having induced emf's of 450V and 410V under no load with an impedances of 0.25+j2 and 0.25+j2.5 ohms. A load of 250KW at 0.8 pf lagging connected at terminals. Determine load current flowing in each transformer if the terminal voltage is 430V? — 7M

### UNIT – III

5. (a) What are the deferent type's connections in three phase transformers? — 7M
   (b) Explain Scott connection in detail with neat circuit and vector diagrams? — 7M

(OR)

6. (a) Explain principle operation of three phase induction motor? What are the main parts in induction motor? — 8M
   (b) Define cogging and crawling effect in induction motor and how to reduce these effects? — 6M

### UNIT – IV

7. (a) Derive relationship between rotor input, rotor copper losses and rotor output? — 7M
   (b) A 415V, 50Hz delta connected induction motor has a star-connected slip ring rotor with a phase transformation ratio of 3.8. The rotor resistance and standstill leakage reactance are 0.013 Ohm and 0.25 Ohm per phase respectively. Neglecting stator impedance and magnetizing current determine. — 7M

   i) The rotor current and power factor at start with slip-rings shorted.

   ii) The rotor current and power factor at 4% slip with slip-rings shorted.

   iii) The external rotor resistance per phase required to obtain a starting current of 35A in the stator supply lines.

(OR)

| | | | |
|---|---|---|---|
| 8. | | Explain how to draw the circle diagram of induction motor and from the determine maximum values of output and torque of induction motor? | 14M |

**UNIT-V**

| | | | |
|---|---|---|---|
| 9. | (a) | What is the necessity of starter? Compare starting current Torque in different types of starting methods in 3 phases Induction Motor? | 8M |
| | (b) | Explain about cogging and crawling of 3 phase induction motor? What are the remedies to avoid the cogging effect? | 6M |

(OR)

| | | | |
|---|---|---|---|
| 10. | (a) | What are the different types of speed control methods? Explain the speed control method from rotor side? | 7M |
| | (b) | Explain the principle of operation of double cage induction motor? | 7M |

**Q.P. Code: 358012** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Electrical & Electronics Measurements (EEE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Explain the construction and working of permanent magnet moving coil instruments 7M
   (b) A moving coil instrument gives a full-scale deflection of 10mA when the potential across its terminals is 100mV. Calculate shunt resistance for a full-scale deflection corresponding to 100 A. 7M

(OR)

2. (a) With neat diagram, explain the construction and operation of attraction type moving iron instrument. 7M
   (b) A moving coil instrument whose resistance is 25Ω gives a full scale deflection with a Current of 1mA. The instrument is to be used with a manganin shunt to extend its range to 100mA. Calculate the error caused by a $100^0$C rise in temperature 7M

**UNIT – II**

3. (a) Explain construction and working of dynamometer wattmeter. 7M
   (b) Explain construction and working of Moving iron type power factor meter 7M

(OR)

4. (a) Explain the construction and operation of single phase induction type energy meter. 7M
   (b) Explain the construction and operation of Electrodynamometer type power factor meter 7M

**UNIT – III**

5. (a) What are the difficulties in the measurement of high resistance? 5M
   (b) Describe in brief about the loss of charge method of measurement of high resistance 9M

(OR)

6. (a) Draw the Kelvin's double bridge circuit and explain the measurement of low resistance using this bridge 7M
   (b) Derive an expression for an unknown capacitance using Schering bridge 7M

**UNIT – IV**

7. (a) Draw the diagram and explain the operation of DC Crompton's potentiometer. 7M
   (b) Describe the construction and working of a polar type ac potentiometer. 7M

(OR)

8. (a) Discuss the major sources of errors in C.T 7M
   (b) Derive the expression for phase angle and ratio errors 7M

**UNIT-V**

9. (a) Explain briefly Ramp type DVM 7M
   (b) Explain briefly Successive approximation type DVM 7M

(OR)

10. (a) Draw the block diagram of a CRO and explain the different components. 7M
    (b) What are Lissajous patterns? From the Lissajous patterns, how can the frequency and the phase difference be measured? 7M

**Q.P. Code: 358212** **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Generation of Electrical Power (EEE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. With a neat schematic layout of TPS, explain the operation of various components of coal fired thermal stations 14M

(OR)

2. (a) What are the advantages and disadvantages of steam power station 7M
   (b) Write about different types of turbines used in thermal power plants 7M

**UNIT – II**

3. (a) What are different types of turbines used in hydro electric power plant? Discuss in detail. 4M
   (b) Explain functions of the following in relation to nuclear power station: (i) Control rod, (ii) Moderator, (iii) Coolant, (iv) Heat exchanger 10M

(OR)

4. (a) Explain the principle of operation of nuclear reactor 7M
   (b) What are the function of spillways and surge tank in hydro power plant. 7M

**UNIT – III**

5. (a) Explain the principles of solar radiation 7M
   (b) What are the different types of Geothermal resources? 7M

(OR)

6. (a) Why energy storage is needed in solar systems? Explain the different types of energy storage methods available 7M
   (b) Explain the principle for guiding the location of Geothermal Plant 7M

**UNIT – IV**

7. (a) Explain the operation of a vertical axis wind turbines 10M
   (b) List and briefly discuss the factors to be considered in selecting the site of land based wind mill. 4M

(OR)

8. (a) What are the major components of wind energy conversion systems? 4M
   (b) Derive the equation for available wind power in terms of velocity of wind and diameter of turbine rotor 10M

**UNIT-V**

9. (a) List the factors affecting biogas generation 7M
   (b) What are the tidal waves? How power can be extracted from the single pool tidal system 7M

(OR)

10. (a) List out the materials used and the process for preparation of Bio-Gas 7M
    (b) Discuss the technology Ocean Thermal Energy Conversion (OTEC). What are possible environmental effects as a result of an operation of an OTEC plant 7M

**Q.P. Code: 358412** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Switching Theory and Logic Design (EEE & ECE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Convert the following numbers: 7M
   (i) (7562.45)10 to octal
   (ii) (175.175)10 to binary
   (iii) (11010111)2 to decimal and octal
   (b) Give the examples of non-weighted codes and explain about Hamming code 7M

(OR)

2. (a) (i) Using 10's complement, subtract 72532-3250 7M
   (ii) Using 2's complement, subtract 1010100-1000011
   (iii) Convert the binary code 10010011 into Gray code
   (b) The 7-bit Hamming coded message 0011011 has been transmitted through a noisy channel. Decode the message assuming that at most a single error has occurred in the code word 7M

**UNIT – II**

3. (a) Using K-map method, simplify the following 4-variable function 7M
   $F(w,x,y,z) = \sum (0, 1, 2, 4, 5, 6, 8, 9, 12, 13)$
   (b) Convert the following expressions into SOP and POS forms 7M
   (i) (AB + C)(B + C'D)
   (ii) (ii) x' + x(x + y')(y + z')

(OR)

4. (a) Reduce the following Boolean expressions to the indicated number of literals 7M
   (i) A'C' + ABC + AC' to three literals
   (ii) (x'y' + z)' + z + xy + wz to three literals
   (iii) A'B(D' + C'D) + B(A + A'CD) to one literal
   (b) Simplify the following Boolean function using tabulation method 7M
   $F(A,B,C,D) = \sum (0, 1, 2, 5, 6, 7, 8, 9, 10, 14)$

**UNIT – III**

5. (a) Implement a full adder with two half adders and one OR gate and explain the operation of full adder with the help of truth table 7M
   (b) Explain 3 x 8 decoder with the help of truth table 7M

(OR)

6. (a) Design a 64:1 MUX using 8:1 MUXs. 7M
   (b) What is Hazard in switching circuits? Explain the design of hazard free switching Circuit with an example. 7M

## UNIT – IV

| | | | |
|---|---|---|---|
| 7. | (a) | Give the comparison between PROM, PLA and PAL. | 7M |
| | (b) | A combinational circuit is defined by the function<br>$F1(A,B,C) = \sum(3, 5, 6, 7)$<br>$F2(A,B,C) = \sum(0, 2, 4, 7)$<br>Implement the circuit with a PLA having three inputs, four product terms and two outputs. | 7M |

(OR)

| | | | |
|---|---|---|---|
| 8. | (a) | Explain PAL with an example. | 7M |
| | (b) | Design BCD to gray code converter and realize using logic gates. | 7M |

## UNIT-V

| | | | |
|---|---|---|---|
| 9. | (a) | Distinguish between synchronous and asynchronous sequential circuits | 7M |
| | (b) | What is the drawback of JK Flip-Flop and explain how it overcomes with master slave JK Flip-Flop | 7M |

(OR)

| | | | |
|---|---|---|---|
| 10. | (a) | Explain synchronous and ripple counters. Compare their merits and demerits | 7M |
| | (b) | Design modulo-8 binary counter using Flip-Flops | 7M |

**Q.P. Code: 358612** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Analog Electronic Circuits (EEE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

### UNIT - I

| | | | |
|---|---|---|---|
| 1. | (a) | Draw the Small Signal Hybrid Model of CB Amplifier & Derive the Expressions for its $A_V$, $A_I$, $R_I$ and $R_O$ | 10M |
| | (b) | Explain Why CE Amplifier more Preferred in Audio Frequency Amplifier? | 4M |
| | | (OR) | |
| 2. | (a) | The h-parameters of a transistor used in a CE circuit are hie = 1 kΩ, hre = 10x10-4, hfe = 50 and hoe = 100 μA/V. The load resistance for the transistor is 1 kΩ. Determine $R_I$, Ro, $A_V$, $A_I$ in the amplifier stage using approximate analysis. Assume Rs = 1000 Ω. | 7M |
| | (b) | Analyze Single Stage FET Amplifier using Hybrid Model? | 7M |

### UNIT – II

| | | | |
|---|---|---|---|
| 3. | (a) | Calculate Overall Lower 3dB & Upper 3dB Frequency for a 3-Stage Amplifier having individual lower cut-off frequency of 40 Hz and Upper Frequency of 2MHz | 7M |
| | (b) | Explain Significance of Cascode Amplifier? | 7M |
| | | (OR) | |
| 4. | (a) | Explain Frequency Response of FET RC Coupled Amplifier? | 7M |
| | (b) | Determine Gain Bandwidth Product for Amplifier? | 7M |

### UNIT – III

| | | | |
|---|---|---|---|
| 5. | (a) | Explain different Amplifiers based on Magnitudes of Input & Output Impedances relative to Source & Load Impedances? | 7M |
| | (b) | Distinguish different types of Feedback Amplifiers? | 7M |
| | | (OR) | |
| 6. | (a) | Explain Barkhausen Criteria and Classify different types of Oscillations? | 7M |
| | (b) | Explain Working Principle of Wein Bridge Oscillator with neat diagram? | 7M |

### UNIT – IV

| | | | |
|---|---|---|---|
| 7. | (a) | Distinguish Small Signal Amplifier & Large Signal Amplifier? | 4M |
| | (b) | Explain Working principle of Push-Pull Class-B Power Amplifier with neat diagram? | 10M |
| | | (OR) | |
| 8. | (a) | Explain Working Principle of Transformer Coupled Class-A Power Amplifier? | 7M |
| | (b) | Explain Higher order Harmonic Distortion and Power Dissipation due to Harmonic Distortion? | 7M |

### UNIT-V

| | | | |
|---|---|---|---|
| 9. | (a) | Draw the RC-High Pass Circuit and Response With respect to Pulse Input? | 7M |
| | (b) | Explain Working Operation of Clipper in detail? | 7M |
| | | (OR) | |
| 10. | (a) | List out the Applications of Schmitt Trigger? | 4M |
| | (b) | Explain Working Operation of Bistable Multivibrator with neat circuit diagram? | 10M |

**Q.P. Code: 457612** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Probability Theory & Stochastic Processes (ECE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) State and Prove the Baye's Theorem
   (b) In a bolt factory Machines A,B,C manufacture 30% ,30%, 40% of the total output respectively. From their outputs 4,5,3 percents are detective bolts .A bolt is drawn at random & found detective .what are the probabilities that it was manufactured by Machines A,B & C.

(OR)

2. (a) Let X be a random variable with probabilities as in table.

| **X** | -1 | 1 | 2 |
|---|---|---|---|
| **P(X)** | 1/5 | 1/6 | 1/3 |

Find a) **E(X)** b) **$E(X^2)$** c)**$E(2x+1)^2$**

   (b) State and Prove any two properties of conditional probability

**UNIT – II**

3. (a) Two random variables X and Y have a joint Probability density Function :

$$f_{X,Y}(X,Y) = \begin{cases} \frac{5}{16} X^2 y & 0 < y < x < 2 \\ elsewhere \end{cases}$$

(i)Find the marginal density function of X and Y.

   (b) Two random variables Y1,Y2 are defined as
$Y_1 = X\cos\theta + Y\sin\theta$
$Y_2 = -X\sin\theta + Y\cos\theta$
Find the co-variance between $Y_1$ and $Y_2$.

(OR)

4. (a) Explain the moments about the origin and mean .
   (b) Explain Markov's and Chernoff's Inequalities.

**UNIT – III**

5. (a) a)Prove Central limit Theorem.
   (b) Joint Pdf of Two variables X,Y is $f_{x,y}(x,y) = \mathbf{ae^{-(x+y)}}$ for $x \geq 0$ , $y \geq 0$ .Find the constant **a** .Are X and Y independent .

(OR)

6. (a) Give an expression for distribution function & Density Function
   (b) A Gaussian random variable X with $\mu_x = 4$ and $\sigma_x = 3$ is generated .Find the probability of $X \leq 7.75$

## UNIT – IV

7. (a) State and Prove the all properties of Cross Correlation Function.

   (b) The auto correlation function for a stationary process X(t) is given by $R_{XX}(\tau)=\mathbf{4+ e^{-|\tau|/10}}$ Find the mean and variance of $Y=\int_0^1 x(t)dt$.

(OR)

8. (a) Find the time average Mean and Time auto correlation function of random process for the random process $X(t)=A\cos(W_0 t +\Theta)$,where A ,$W_0$ are constants and $\Theta$ is a uniformly distributed random variable in the interval $(0,2\pi)$.

   (b) Explain Time Averages and Ergodocity.

## UNIT-V

9. (a) Define and Explain the following random Process: (i)Band Pass (ii) Band Limited (iii)Narrowband.

   (b) A mixer stage has a noise figure of 20dB and this is preceded by a amplifier that has a noise figure of 9dB and an available power gain 15dB.Calculate the overall noise figure referred to the input.

(OR)

10. (a) Show that a narrow band noise process can be expressed as in-phase and quadrature components of it.

    (b) Explain the Properties of Band Limited Random Processes

**Q.P. Code: 457812** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Electromagnetic Waves & Transmission Lines (ECE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) What is lossless dielectric? Explain propagation of uniform plane wave in perfect dielectric. 7M

   (b) A wave propagating in a lossless dielectric has components 7M
   $\overline{E} = 500\cos(10^7 t - \beta z)\overline{a_x}$ V/m and $\overline{H} = 1.1\cos(10^7 t - \beta z)\overline{a_y}$ A/m. If the wave is travelling at a velocity 0.5 times the velocity in free space, find
   (i) $\mu_r$ (ii) $\beta$ (iii) $\lambda$ (iv) $\eta$ .

(OR)

2. (a) Derive the expression describing propagation of uniform plane in good conductor. 7M

   (b) Calculate the intrinsic impedance , propagation constant and wave velocity for a conducting medium in which $\sigma = 50$ MS/m, $\mu_r = 1$ at frequency of 100MHz.

**UNIT – II**

3. (a) Derive the expression for reflection coefficient and transmission coefficient for an oblique incident wave having (i) perpendicular polarization (ii) parallel polarization. 7M

   (b) A uniform plane of 200MHz travelling in a free space impinges normally on a large block of material having $\varepsilon_r = 4$, $\mu_r = 9$, $\sigma = 0$ , Calculate transmission and reflection coefficient at the interface. 7M

(OR)

4. (a) State and prove the pointing theorem? 7M

   (b) A perpendicular polarized wave is incident at angle of $\theta_i = 15^0$ .It is propagating from medium 1 to medium 2 .Medium 1 is defined by $\mu_r = 1, \varepsilon_r = 8.5$ *and* $\sigma_1 = 0$ and medium2 is free space. If $E_i = 1.0$ mV/m , determine $E_r, H_i$ and $H_r$. 7M

**UNIT – III**

5. (a) Starting from fundamental, derive the expression for voltage and current at any point on line which is at a distance's' from the receiving end voltage and current. 7M

   (b) A transmission line has $Z_0 = 745\angle -120^0 \Omega$ and is terminated in $Z_R = 100\Omega$ .Calculate the reflection loss and return loss in dB. 7M

(OR)

6. (a) Derive the expression for input impedance and transfer impedance in terms of $Z_0, Z_R$ *and* $\gamma$ . 7M

   (b) A cable has following parameters: R= 48.75Ω/km, G=38.75 /km and C=0.059 μF/km. Determine the characteristic impedance, propagation constant and wave length for a source of $f$ =1600 Hz and $F_s$ =1.0 volts. 7M

## UNIT – IV

7. (a) Show that the "half-wave" line repeats its terminating impedance. 7M

(b) A lossless transmission line of length 100m has an inductance of 28 $\mu H$ and capacitance of 20nF. Find (i) Propagation velocity (ii) Phase constant at an operating frequency100kHz (iii) Characteristic impedance of the line. 7M

(OR)

8. (a) Sketch the voltage and current distribution along matched, open and short circuited transmission line. 7M

(b) A lossless line of 300Ω is terminated by a load of $Z_R$ .If the VSWR at 200MHz is 4.48 and first min is located at 6cm from the load, calculate the reflection coefficient and $Z_R$ . 7M

## UNIT-V

9. (a) Sketch the field lines for the $TM_{11}$ mode .Derive the instantaneous expression for the surface current density of this mode. 7M

(b) An air-filled rectangular waveguide of dimensions a = 4 cm, b = 2 cm transports energy in the dominant mode at a rate of 2 mW. If the frequency of operation is 10 GHz, determine the peak value of the electric field in the waveguide. 7M

(OR)

10. (a) For square waveguide, show that attenuation $\alpha_c$ is minimum for $TE_{10}$ mode when $f = 2.962 f_c$. 7M

(b) A copper-plated waveguide ( $\sigma_C$ = 5.8 X $10^7$ S/m) operating at 4.8 GHz is supposed to deliver a minimum power of 1.2 kW to an antenna. If the guide is filled with polystyrene ($\sigma$ = $10^{17}$ S/m,$\varepsilon$= 2.55 $\varepsilon_O$ ) and its dimensions are a = 4.2 cm, b = 2.6 cm, calculate the power dissipated in a length 60 cm of the guide in the $TE_{10}$ mode. 7M

**Q.P. Code: 458012** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Pulse and Digital Circuits (ECE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

| | | | |
|---|---|---|---|
| 1. | (a) | Draw the output waveform of an RC high-pass circuit with a square wave input under different time constants. Derive the expression for percentage of tilt. | 8M |
| | (b) | Explain in detail about RC High Pass Circuit for Sinusoidal and Step Inputs with neat diagrams? | 6M |
| | | (OR) | |
| 2. | | Explain in detail about RC Low Pass Circuit for square wave Input with neat diagrams? | 14M |

**UNIT – II**

| | | | |
|---|---|---|---|
| 3. | (a) | What is a clipper? Explain different types of Series Clippers? | 7M |
| | (b) | Explain in detail about Transistor Clippers? | 7M |
| | | (OR) | |
| 4. | (a) | Explain the working of a two-level diode clipper with the help of circuit diagram? | 7M |
| | (b) | Explain in detail about different types of Shunt Clippers? | 7M |

**UNIT – III**

| | | | |
|---|---|---|---|
| 5. | | Explain in detail about Astable Multivibrator and its types? | 14M |
| | | (OR) | |
| 6. | (a) | Explain in detail about Schmitt trigger Circuit? | 7M |
| | (b) | Explain the operation of Bi-stable Multivibrator? | 7M |

**UNIT – IV**

| | | | |
|---|---|---|---|
| 7. | (a) | What is Time Base generator and Explain the general features of a time base signal? | 7M |
| | (b) | Explain in detail about Exponential Sweep Circuit? | 7M |
| | | (OR) | |
| 8. | | Explain in detail about Transistor Bootstrap Time Base generator? | 14M |

**UNIT-V**

| | | | |
|---|---|---|---|
| 9. | | Explain briefly about CMOS Inverter, RTL NOR gate, Two input ECL NOR gates? | 14M |
| | | (OR) | |
| 10. | (a) | Draw the circuit diagram of diode-resistor logic OR, AND gates and explain its operation | 10M |
| | (b) | Compare IC logic families | 4M |

**Q.P. Code: 458212** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Electronic Circuit Analysis (ECE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Explain the CE amplifier with voltage divider bias in terms of input impedance, output impedance, voltage gain and current gain. 7M
   (b) Draw the neat diagram of JFET amplifier and compare with BJT amplifier. 7M

(OR)

2. (a) Explain the concept of amplifier with suitable example. 7M
   (b) Explain the following 7M
   i) Conversion efficiency
   ii) Bandwidth
   iii) Distortion

**UNIT – II**

3. (a) Derive the all h-parameters for common emitter amplifier. 6M
   (b) A CE amplifier uses load resistor $R_L$ = 3.5kΩ in the collector circuit and is given by the voltage source $V_S$ of internal resistance 1200Ω. The h-parameters are $h_{ie}$ = 1400Ω, $h_{re} = 5\times10^{-4}$, $h_{fe}$ = 90 and $h_{oe}$ = 33 μA/V. Neglecting the biasing resistors supply, compute the current gain , input resistance, voltage gain, output resistance and output terminal resistance for the following values of emitter resistor $R_E$ inserted in the emitter circuit : i) 450Ω ii) 500Ω. Use the approximate model for the transistor if permissible. 8M

(OR)

4. (a) Explain the approximate model of CB,CC, and CE amplifier. 7M
   (b) A CE amplifier is driven by a voltage source of internal resistance $r_s$=1000Ω, and the load impedance is a resistance $R_L$=1200Ω. The h-parameters are $h_{re}=3\times10^{-4}$, $h_{ie}$=2KΩ, $h_{fe}$= 100 and $h_{oe}$=50μA/V. Compute the current gain, output resistance using exact analysis. 7M

**UNIT – III**

5. (a) Write the comparisons of small signal model of CS, CD and CG amplifier. 7M
   (b) Draw the basic Darlington bias circuit and derive the AC input impedance, AC output impedance. 7M

(OR)

6. (a) Explain the high frequency response of JFET CS amplifier. 7M
   (b) In the CD amplifier, let $R_S$ = 8kΩ, $R_G$ = 20MΩ, μ = 80, and $r_d$ = 45kΩ. Evaluate the voltage gain $A_V$, Input impedance $Z_I$ and output Impedance $Z_O$. 7M

**UNIT – IV**

7. (a) Explain in detail about effect of negative feedback on i) gain and ii) bandwidth. 6M
   (b) Write the conditions for Oscillation and Explain in detail about Crystal Oscillator. 8M

(OR)

8. (a) Draw the CE amplifier with Voltage series feedback. If $R_S$ = 800Ω, $h_{ie}$ = 10kΩ, $h_{fe}$ = 50, $R_L$ = 4kΩ, $R_B$ = 50kΩ. Calculate $A_{Vf}$, $R_{if}$, and $R_{of}$. 7M
   (b) Draw the neat diagram of Weigh bridge oscillator, and derive the frequency of oscillations. 7M

**UNIT-V**

9. (a) What is the significance of Tuned amplifier and write short notes about small signal tuned amplifier. 7M
   (b) Draw the neat diagram of Class-B amplifier and derive the expression for efficiency. 7M

(OR)

10. (a) Explain the effect of cascading single tuned amplifiers on bandwidth. 7M
    (b) Compare the all power amplifiers in terms of efficiency 7M

**Q.P. Code: 458612** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Analog Communications (ECE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Define amplitude modulation? Describe the basic operation of an AM modulator. 7M
   (b) Explain the concept of frequency translation using the spectrum of DSB-SC wave. 7M

(OR)

2. (a) State the Limitations of communication systems and their effects. 7M
   (b) Explain about the demodulation of SSB-SC signal using Synchronous detection. 7M

**UNIT – II**

3. (a) Derive the relationship between phase and frequency modulations 7M
   (b) A carrier of frequency $10^6$ Hz and amplitude 3 volts. This carrier is frequency modulated by a sinusoidal modulating waveform of frequency 500Hz and of peak amplitude 1 volt. As a consequence, the frequency deviation is 1KHz.The level of modulating waveform is changed to 5 volts peak, and the modulating frequency is changed to 2kHz.write the expression for new modulated waveform. 7M

(OR)

4. (a) What is Narrow Band FM and Wideband FM? Explain. 7M
   (b) A Single-tone modulating signal $\cos(10\pi\times10^3t)$ frequency modulates a carrier of 10MHz and produces a frequency deviation of 75kHz.Find 7M
   (i)The modulation index
   (ii)Phase deviation produced in the FM wave.
   (iii)If another modulating signal produces a modulation index of 100 while maintaining the same deviation ,find the frequency and amplitude of the modulating signal, assuming $K_f$ =10kHz/V

**UNIT – III**

5. (a) With the aid of the block diagram explain TRF receiver. Also explain the basic super heterodyne principle. 7M
   (b) A TRF receiver is tuned to 1000kHz AM radio broadcast signal by a variable tuned circuit with 1kHz bandwidth. Find the bandwidth when receiver is retuned to 1550kHz and 550kHz.Determine the recovered baseband. 7M

(OR)

6. (a) Discuss the following terms. 7M
   (i) Double spotting, (ii) Selectivity, (iii) Sensitivity, (iv) Fidelity.
   (b) What is a simple automatic gain control? What are its functions? 7M

**UNIT – IV**

7. (a) Derive the expression for the S/N ratio of AM system. 9M
   (b) Explain FM Threshold effect. 5M

(OR)

8. (a) Prove that the figure of merit of AM system for Single tone modulation with 100% modulation is 1/3. 7M
   (b) Explain pre-emphasis and de-emphasis filtering with the help of transfer function. 7M

**UNIT-V**

9. (a) Briefly explain the Flat-top sampling. 7M
   (b) What are different types of pulse modulations? Explain. 7M

(OR)

10. (a) What is single polarity and double polarity in PAM? Explain in brief. 7M
    (b) Discuss the generation and demodulation of PWM. 7M

**Q.P. Code: 557612** **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Manufacturing Technology (ME)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

| | | | |
|---|---|---|---|
| 1. | (a) | What are the necessary steps involved in Sand Casting? Explain | 7M |
| | (b) | What are the Materials that are generally used for making patterns? Explain the reasons for their choice | 7M |
| | | (OR) | |
| 2. | (a) | What are the common allowances that are provided on pattern? Why and How they are provided? Give suitable Examples. | 7M |
| | (b) | Describe the various elements of a gating system. | 7M |

**UNIT – II**

| | | | |
|---|---|---|---|
| 3. | (a) | Explain the process of investment casting. State its industrial applications. | 7M |
| | (b) | Describe the true centrifugal casting with a neat sketch. State its advantages and limitations. | 7M |
| | | (OR) | |
| 4. | (a) | What are different zones in cupola? Explain. | 7M |
| | (b) | Describe crucible furnace and explain its working. | 7M |

**UNIT – III**

| | | | |
|---|---|---|---|
| 5. | (a) | Explain the working principle of Gas welding. Give its advantages. | 7M |
| | (b) | Explain the types of oxy acetylene flames. | 7M |
| | | (OR) | |
| 6. | (a) | Explain the working principle of arc welding and write its merits and demerits. | 7M |
| | (b) | Explain the working principle of water plasma with a neat sketch. | 7M |

**UNIT – IV**

| | | | |
|---|---|---|---|
| 7. | (a) | Discuss the laser beam welding process. | 7M |
| | (b) | Explain various non-destructive methods of testing of weldments. | 7M |
| | | (OR) | |
| 8. | (a) | Explain the TIG & MIG welding process. | 7M |
| | (b) | Explain the Explosive welding with neat sketch. | 7M |

**UNIT-V**

| | | | |
|---|---|---|---|
| 9. | (a) | Explain the types of rolling mills? | 7M |
| | (b) | Differentiate between forward extrusion and backward extrusion. | 7M |
| | | (OR) | |
| 10. | (a) | Why press forging is preferred to hammer forging. | 7M |
| | (b) | Explain various forging operations. | 7M |

**Q.P. Code: 557812** **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Thermal Engineering - I (ME)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Explain the working principle of four-stroke compression ignition engine with a neat diagram. 7M
   (b) What are the merits and demerits of two-stroke I.C engines over four-stroke I.C engines. 7M

(OR)

2. (a) Explain the actual valve timing diagram of a four stroke SI engine and compare with ideal valve timing diagram. 7M
   (b) What are the major differences between S.I. Engine and C.I. Engine? Explain them with suitable examples 7M

**UNIT – II**

3. (a) Discuss the various important qualities of a good ignition system. 7M
   (b) What are different air-fuel mixture on which an engine can be operated. Explain clearly. 7M

(OR)

4. (a) Discuss the various characteristics of an efficient cooling system. 7M
   (b) Explain (i) Thermo-syphon cooling system, (ii) Pressure cooling system 7M

**UNIT – III**

5. (a) Explain the effect of various engine variables on SI engine knock. 7M
   (b) Discuss the desirable characteristics of a good combustion chamber for SI engine. 7M

(OR)

6. (a) Bring out clearly the process of combustion in CI engines and also explain the various stages of combustion. 7M
   (b) Classify and explain the CI engine combustion chambers. 7M

**UNIT – IV**

7. The output of a single cylinder four-stroke I.C engine is measured by a rope brake dynamometer. The diameter of brake pulley is 750 mm and rope diameter 50 mm. The dead load on the tight side of the rope is 400 N and spring balance reading is 50 N. The bore is 150 mm and the stroke is 190 mm. The engine consumes 4 kg/hr of fuel at rated speed of 1000 rpm. The calorific value of fuel is 44 MJ/kg. Calculate the brake specific fuel consumption, bmep and brake thermal efficiency. If the mechanical efficiency is 80%, calculate IP, imep, indicated specific fuel consumption and indicated thermal efficiency. 14M

(OR)

8. What is the significance of heat balance sheet? Discuss the procedure to draw heat balance sheet for C.I. engine. 14M

## UNIT-V

9. The free air delivered by a single stage, double acting air compressor measured at 1.013 bar and $15^0$ C is 14 $m^3$ /min. The pressure and temperature in the cylinder during induction are 0.95 bar and $32^0$ C. The delivery pressure is 7 bar and the index of compression and expansion, n = 1.3. If the clearance volume is 5% of the swept volume, calculate the indicated power and volumetric efficiency. 14M

(OR)

10. An axial flow compressor compresses air from an inlet condition of 1 bar and 290K to a delivery pressure of 5 bar with an overall isentropic efficiency of 87 per cent. The degree of reaction is 0.5 and the blade angles at inlet and outlet are $44^0$ and $13^0$ respectively. The mean blade speed and axial velocity are constant throughout the compressor. Assuming a blade velocity of 180 m/s, and workdone factor 0.85, calculate the number of stages. 14M

**Q.P. Code: 558012** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Kinematics of Machinery (ME)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

1. What do you mean by inversion? Explain the inversions of quadric cycle chain with a neat sketches. 14M

(OR)

2. (a) Define Grashof's law. State how is it helpful in classifying the four link mechanisms into different types? 8M
   (b) Define the mobility of the mechanism? 6M

**UNIT – II**

3. Explain the Hart mechanism with a neat sketch and Prove that it produces an exact straight line motion. 14M

(OR)

4. (a) Derive the condition for correct steering. 7M
   (b) Differentiate Davis and Ackermann steering gear mechanisms with the help of neat sketches. 7M

**UNIT – III**

5. (a) Define the terms displacement, velocity and acceleration. 6M
   (b) In a four bar chain ABCD link AD is fixed and in 15 cm long. The crank AB is 4 cm long rotates at 180 rpm (cw) while link CD rotates about D is 8 cm long BC = AD and angle BAD is 60 degrees. Find angular velocity of link CD. 8M

(OR)

6. (a) State and prove Arnold Kennedy's theorem. 7M
   (b) A slider crank mechanism has lengths of crank and connecting rod equal to 200 mm and 800 mm respectively locate all the instantaneous centers of the mechanism for the position of the crank when it has turned through 30 degrees from IOC. Also find velocity of slider and angular velocity of connecting rod if crank rotates at 40 rad/sec. 7M

**UNIT – IV**

7. Discuss the displacement, velocity and acceleration diagrams when the follower moves with SHM. 14M

(OR)

8. A cam operating a knife - edged radial follower has the following data. Follower moves outwards through 50mm during 120° of cam rotation. 14M

   Follower dwells for the next 45°.
   Follower returns of its original position during next 90°.
   Follower dwells for the rest of the rotation.

   The displacement of the follower is to take place with uniform velocity during the outward and the return strokes. The least radius of the cam is 50mm. Draw the cam profile.

**UNIT-V**

9. Derive an expression for the minimum number of teeth required on the pinion in order to avoid interference in involute gear teeth when it meshes with wheel. 14M

(OR)

10. (a) Two 20 degrees involute spur gears have a module of 10 mm. The addendum is one module. The larger gear has 50 teeth and the pinion has 13 teeth. Does interference occur? If it occurs, to what valve should the pressure angle be changed to eliminate interference? 8M
    (b) State the phenomenon of interference and list the methods which are used to avoid the interference. 6M

**Q.P. Code: 558212** **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
## *SUB: Mechanics of Fluids (ME)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

### UNIT - I

1. (a) Differentiate between U-tube and Differential Manometer With a neat sketch. 8M
   (b) What are the gauge pressure and absolute pressure at a point 3m below the free surface of a liquid having a density of 1530 kg/$m^3$ if the atmospheric pressure is equivalent to 750 mm of Hg? The specific gravity of mercury is 13.6 and density of water 1000 kg/$m^3$. 6M

(OR)

2. (a) A Newtonian fluid in the clearance between a shaft and a concentric sleeve. The sleeve attains a speed of 50 cm/s, when a force of 40N is applied to the sleeve parallel to the shaft. Determine the speed if a force of 200N is applied. 6M
   (b) Explain the following? 8M
   (i) Mass density, (ii) Weight density, (iii) Kinematic viscosity, (iv) Dynamic viscosity

### UNIT – II

3. (a) Explain the following. 8M
   (i) Velocity potential function, (ii) Stream function,
   (iii) Stream line, (iv) Equipotential line.
   (b) Water flows through a pipe AB 1.2 m diameter at 3 m/s and then passes through a pipe BC 1.5 m diameter. At C, the pipe branches. Branch CD is 0.8 m in diameter and carries one third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC and the velocity in CE. 6M

(OR)

4. Define the equation of continuity. Obtain an expression for continuity equation for a three-dimensional flow. 14M

### UNIT – III

5. Derive friction factor for the flow through the circular pipe by Darcy Weisbach equation? 14M

(OR)

6. (a) An oil sp.gr. 0.8 is flowing through a venturi meter having inlet diameter 20 cm and throat diameter 10 cm. The oil-mercury differential manometer shows a reading of 25cm. Calculate the discharge of oil through the horizontal venturi meter. Take $C_d$=0.98. 7M
   (b) Derive the expression for rate of flow through orifice meter. 7M

### UNIT – IV

7. (a) Determine the thickness of the boundary layer at the trailing edge of smooth plate of length 4 m and width 1.5 m, where the plate is moving with a velocity of 4 m/s in stationary air. Take kinematic viscosity of air as $1.5x10^{-5}$ $m^2/s$ 8M
   (b) Explain the following: 6M
   i) Laminar Boundary layer, ii) Turbulent boundary Layer

(OR)

| | | | |
|---|---|---|---|
| 8. | (a) | Define the following:<br>(i) Boundary Layer Thickness, ii) Displacement Thickness,<br>iii) Momentum Thickness, iv) Energy Thickness | 8M |
| | (b) | Find the displacement thickness for the velocity distribution in the boundary layer is given by $\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^2$ | 6M |

**UNIT-V**

| | | | |
|---|---|---|---|
| 9. | (a) | Give the expression for Drag and lift for sub merged solid in the fluid. | 6M |
| | (b) | A metallic sphere of specific gravity 7 falls in oil of density 800 kg/m$^3$. The diameter of the sphere is 8 mm and it attains a terminal velocity of 40 mm/s. Find the viscosity of oil in poise. | 8M |

(OR)

| | | | |
|---|---|---|---|
| 10. | (a) | Explain the concept of 'Terminal velocity of body'. | 4M |
| | (b) | A cylinder rotates at 150 rpm with its axis perpendicular in an air stream which is having uniform velocity of 25 m/s. The cylinder is 1.5 m in diameter and 10 m long. Assuming ideal fluid theory, find (i) the circulation, (ii) lift force and (iii) position of stagnation points. Take density of air as 1.25 kg/m$^3$ | 10M |

**Q.P. Code: 558412** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Composite and Nano Materials (ME)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT – I**

1. Explain the classification of composite material based on reinforcement material used. 14M

(OR)

2. What is Fiber glass reinforced composites? Explain the Fabrication of Fiber reinforced composites by pultrusion process. 14M

**UNIT – II**

3. List out properties and applications of polymer matrix composites and carbon-carbon composites. 14M

(OR)

4. What are the functions of matrix phase? Explain properties and applications of metal matrix composites and ceramics matrix composites. 14M

**UNIT – III**

5. Write shorts notes on the following 14M
   (i) Portland cement concretes (ii) Reinforced cement concretes.

(OR)

6. Write properties and applications of pre stressed concrete and Hybrid Composites. 14M

**UNIT – IV**

7. a) List the limitations of ceramic materials? 7M
   b) Explain about fabrication of glass by flat drawing process. 7M

(OR)

8. Explain fabrication of glass by rolling process and casting process. 14M

**UNIT-V**

9. Describe the properties and applications of nano-phase materials and advanced ceramics. 14M

(OR)

10. List out properties and applications of smart material alloys and cermets. 14M

**Q.P. Code: 558612** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020

***SUB:*** **PROBABILITY AND STATISTICS (COMMON TO CSE & ME)**

Time : 3 Hours | Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

### UNIT - I

1. The random variable X has the following probability function 14M

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| $P(x)$ | 0 | $2k$ | $2k$ | $3k$ | $k^2$ | $2k^2$ | $7k^2+k$ |

Find $(i)\ k$ $(ii)$ mean $(iii)$ variance *and* $(iv)\ P(x<6)$

(OR)

2. Probability density function of a random variable X is 14M

$$f(x)=\begin{cases}\frac{1}{2}sinx, for\ 0\le x\le\pi\\ 0\ , otherwise.\end{cases}$$

Find the mean,mode and median of the distribution and also find the probability between 0 and $\frac{\pi}{2}$.

### UNIT – II

3. (a) The probability that a pen manufactured by a company will be defective is $\frac{1}{10}$. If 2 such pens are manufactured, find the probability that (i) Exactly two will be defective, (ii) at least two will be defective. 7M

(b) Find the mean and variance of the Uniform distribution. 7M

(OR)

4. In a test on 2000 electric bulbs, it was found that the life of a particular make, was normally distributed with an average life of 2040 hours and S.D of 60 hours. Estimate the number of bulbs likely to burn for (i) more than 2150 hours (ii) less than 1950 hours and (iii) more than 1920 hours and but less than 2160 hours. 14M

### UNIT – III

5. Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. 14M

(OR)

6. Two samples of sizes 9 and 8 give the sum of squares of deviations from their respective means equal to 160 inches$^2$ and 91 inches$^2$ respectively. Can these be regarded as drawn from the same normal population? 14M

### UNIT – IV

7. Find the regression lines of $x$ on $y$ and $y$ on $x$ and for the following data. 14M

| $x$ | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| $y$ | 2 | 5 | 3 | 8 | 7 |

(OR)

8. Three judges A, B, C give the following ranks. Find which pair of judges has common approach 14M

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| A | 1 | 6 | 5 | 10 | 3 | 2 | 4 | 9 | 7 | 8 |
| B | 3 | 5 | 8 | 4 | 7 | 10 | 2 | 1 | 6 | 9 |
| C | 6 | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 |

**UNIT-V**

9. Given below are values of sample mean $\bar{X}$ and sample range R for 10 samples, each of size 5. Draw the appropriate mean and range charts and comment on the state of control of the process. 14M

| Sample No | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Mean | 43 | 49 | 37 | 44 | 45 | 37 | 51 | 46 | 43 | 47 |
| Range | 5 | 6 | 5 | 7 | 7 | 4 | 8 | 6 | 4 | 6 |

(OR)

10. An inspection of 10 samples of size 400 each from 10 lots revealed the following defective units. 14M

| Sample no | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| No of defective units | 17 | 15 | 14 | 26 | 9 | 4 | 19 | 12 | 9 | 15 |

Construct a suitable control chart for the above data and state your conclusions.

**Q.P. Code: 657612** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Computer Organization (CSE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT – I**

| | | | |
|---|---|---|---|
| 1. | (a) | Explain the role of program counter and instruction register in addressing modes? | 7M |
| | (b) | Discuss the different types of addressing modes? | 7M |
| | | (OR) | |
| 2. | (a) | Define condition codes? Can a processor be designed without any condition codes? | 7M |
| | (b) | Explain the functional units of a general computer? | 7M |

**UNIT – II**

| | | | |
|---|---|---|---|
| 3. | (a) | Distinguish between memory mapped I/O and I/O mapped I/O? | 7M |
| | (b) | Explain a procedure to handle an interrupt? | 7M |
| | | (OR) | |
| 4. | (a) | Explain shift micro operations and draw 4 bit combinational circuit shifter | 7M |
| | (b) | Draw and explain logic micro operation in detail | 7M |

**UNIT – III**

| | | | |
|---|---|---|---|
| 5. | (a) | What is micro-programmed control? explain in detail | 7M |
| | (b) | Write the booth multiplication algorithm. Draw the flowchart and explain with an real time example | 7M |
| | | (OR) | |
| 6. | (a) | Explain IEEE standard for floating-point numbers | 7M |
| | (b) | Explain the concept of Floating point addition with subtraction unit with neat diagram | 7M |

**UNIT – IV**

| | | | |
|---|---|---|---|
| 7. | (a) | Discuss the various mapping techniques used in cache memories | 7M |
| | (b) | Give the basic cell of an associative memory and explain its operation. Show how associative memories can be constructed using this basic cell | 7M |
| | | (OR) | |
| 8. | (a) | Explain in detail about standard I/O interface | 7M |
| | (b) | Describe the functions of SCSI with a neat diagram | 7M |

**UNIT-V**

| | | | |
|---|---|---|---|
| 9. | (a) | Explain briefly parallel processing and pipelining concepts | 7M |
| | (b) | Explain the use of push and pop instruction in 8086 ? | 7M |
| | | (OR) | |
| 10. | (a) | Define relative memory addressing with an example | 7M |
| | (b) | Explain about Main Building blocks of the Ultra SPARC II Processor with neat diagram | 7M |

**Q.P. Code: 657812** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

## B.Tech. IV Sem (R15) Supple. Examinations of April 2020

## *SUB: Java Programming (CSE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

| | | | |
|---|---|---|---|
| **UNIT - I** | | | |
| 1. | (a) | Explain briefly buzzwords of java | 7 M |
| | (b) | Explain briefly about method overloading with an example program. | 7 M |
| (OR) | | | |
| 2. | (a) | Write briefly about OOP concepts. | 7 M |
| | (b) | Explain about different access modifiers in java | 7 M |
| **UNIT – II** | | | |
| 3. | (a) | Explain the purpose of Super keyword with suitable example program | 7 M |
| | (b) | Define Abstract class. Demonstrate Abstract class with an example program | 7 M |
| (OR) | | | |
| 4. | (a) | Write a java program to demonstrate implementing interfaces | 7 M |
| | (b) | Explain the use of this and final keywords with suitable examples | 7 M |
| **UNIT – III** | | | |
| 5. | (a) | Explain the differences between Multithreading and Multitasking | 7 M |
| | (b) | Explain the keywords throw and throws with suitable examples | 7 M |
| (OR) | | | |
| 6. | (a) | Write a java program to demonstrate try and catch blocks | 7 M |
| | (b) | Write a java program to implement threads using thread class | 7 M |
| **UNIT – IV** | | | |
| 7. | (a) | Write a java program to implement mouse events | 8 M |
| | (b) | Explain briefly about Delegation event model | 6 M |
| (OR) | | | |
| 8. | (a) | Explain flow layout with an example program | 7 M |
| | (b) | Write a java program to demonstrate buttons | 7 M |
| **UNIT-V** | | | |
| 9. | (a) | Explain how to create tabbed panes with an example program | 7 M |
| | (b) | Explain applet life cycle with an example | 7 M |
| (OR) | | | |
| 10. | (a) | Explain various categories of repaint() methods | 7 M |
| | (b) | Explain scroll panes with an example program | 7 M |

**Q.P. Code: 658012** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020

## *SUB: Formal Languages & Automata Theory (CSE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

### UNIT - I

1. (a) Define the following terms 8M
   i) Finite automata ii) Regular Expressions iii) Alphabet iv) String
   (b) **(0/1)*011** for this regular expression draw the NFA with ε-closures and convert it into NFA 6M

(OR)

2. (a) Construct DFA equivalent to regular expression **(0+1)*(00+11)(0+1)*** and also find the reduced DFA. 7M
   (b) Convert the regular expression **(((00)*(11))+01)*** into an NFA 7M

### UNIT – II

3. (a) Explain closure properties of regular sets? 6M
   (b) Give the properties of regular expressions and state and prove Arden's theorem 8M

(OR)

4. Define the DFA and regular expression. DFA accepts all strings corresponding to the expression **1*01(0+11)***. Also explain how to convert DFA to regular expression by eliminating states. 14M

### UNIT – III

5. (a) Construct a regular grammar for the regular expression **a*b(a + b)*** 7M
   (b) Convert the following right liner grammar to left linear 7M
   $S \rightarrow 0A$
   $A \rightarrow 1A$
   $A \rightarrow \varepsilon$

(OR)

6. (a) Check whether the given grammar is ambiguous or not. 7M
   $S \rightarrow i\ C\ t\ S$
   $S \rightarrow i\ C\ t\ S\ e\ S$
   $S \rightarrow a$
   $C \rightarrow b$
   (b) Eliminate the unit productions from following grammar 7M
   $S \rightarrow AB$
   $A \rightarrow a$
   $B \rightarrow C \mid b$
   $C \rightarrow D$
   $D \rightarrow E \mid bC$
   $E \rightarrow d \mid Ab$

## UNIT – IV

| | | | |
|---|---|---|---|
| 7. | (a) | Define push down automata? Design PDA for the language L = {001} | 7M |
| | (b) | Write a steps for construction of PDA from CFG | 7M |
| | | (OR) | |
| 8. | (a) | Explain about PDA with two stacks with diagram? | 6M |
| | (b) | Explain the difference between deterministic and non-deterministic push down automata, give an example of each? | 8M |

## UNIT-V

| | | | |
|---|---|---|---|
| 9. | (a) | Define Turing machine? Construct a Turing machine M for $\Sigma$ = {a,b} which will convert lower case letters to upper case. | 7M |
| | (b) | Write a short note on basic model of Turing machine. | 7M |
| | | (OR) | |
| 10. | (a) | What is linear bounded automata? Explain with some example. | 7M |
| | (b) | Show that the grammar<br>$S \rightarrow aX$<br>$X \rightarrow Xbb \mid b$<br>is LR (0) grammar | 7M |

**Q.P. Code: 658212** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020

***SUB: Database Management Systems (CSE)***

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

| | | | |
|---|---|---|---|
| 1. | (a) | Explain the relational Database architecture. | 8M |
| | (b) | Explain different types of Database languages. | 6M |
| | | (OR) | |
| 2. | (a) | What is a Relational Model? | 4M |
| | (b) | Construct an E-R diagram for a online shopping system like Jabong/Flipkart | 10M |

**UNIT – II**

| | | | |
|---|---|---|---|
| 3. | (a) | What are the Integrity Constraints? Explain in Detail. | 7M |
| | (b) | Discuss about domain relational calculus. | 7M |
| | | (OR) | |
| 4. | (a) | What are the Relational Set Operations and explain? | 7M |
| | (b) | Explain different types of Aggregate Functions? | 7M |

**UNIT – III**

| | | | |
|---|---|---|---|
| 5. | (a) | Explain Multi valued Dependencies with examples? | 7M |
| | (b) | What is meant by Redundancy? What are Problems Caused by Redundancy? | 7M |
| | | (OR) | |
| 6 | | Explain different types of Normal forms? | 14M |

**UNIT – IV**

| | | | |
|---|---|---|---|
| 7. | (a) | Explain Transformation of Relational Expressions | 7M |
| | (b) | Explain Heuristic Optimization? | 7M |
| | | (OR) | |
| 8. | (a) | What are ACID Properties and Explain? | 7M |
| | (b) | Explain Concurrent Executions in transaction? | 7M |

**UNIT-V**

| | | | |
|---|---|---|---|
| 9. | (a) | Explain lock Based Protocols. | 7M |
| | (b) | Discuss about failure with loss of nonvolatile storage. | 7M |
| | | (OR) | |
| 10. | (a) | Describe the steps in crash recovery in ARIES | 7M |
| | (b) | Explain time stamp based Protocol for concurrence control? | 7M |

**Q.P. Code: 658412** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
### *SUB: Operating Systems (CSE)*

Time : 3 Hours Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

| | | | |
|---|---|---|---|
| 1. | (a) | Define Operating Systems? Explain the basic functions of Operating Systems. | 7M |
| | (b) | Briefly Explain about the Operating System Services. | 7M |
| | | (OR) | |
| 2. | (a) | Discuss about the System Programs. | 7M |
| | (b) | With a neat Diagram, Explain about the Operating System Structure. | 7M |

**UNIT – II**

| | | | |
|---|---|---|---|
| 3. | (a) | Discuss the need of CPU Scheduling Algorithm and explain any one of the CPU Scheduling Algorithm with an example. | 9M |
| | (b) | Write short notes on monitors. | 5M |
| | | (OR) | |
| 4. | (a) | How Semaphores is going to solve the problem of synchronization. | 7M |
| | (b) | Explain about the various parameters of Scheduling criteria | 7M |

**UNIT – III**

| | | | |
|---|---|---|---|
| 5. | (a) | Explain the LRU Page Replacement algorithm with an example? | 7M |
| | (b) | Discuss about the Structure of the Page Table. | 7M |
| | | (OR) | |
| 6. | (a) | Explain about the Segmentation | 7M |
| | (b) | Write Short notes on i) Equal Allocation ii) Proportional Allocation. | 7M |

**UNIT – IV**

| | | | |
|---|---|---|---|
| 7. | (a) | List out the conditions for occurrence of deadlock in a system. | 7M |
| | (b) | Explain about the Single-Level Directory & Two-Level Directory? | 7M |
| | | (OR) | |
| 8. | (a) | Identify the different types of File Access Methods. | 7M |
| | (b) | What are the possibilities to recover from deadlock? | 7M |

**UNIT-V**

| | | | |
|---|---|---|---|
| 9. | | Explain in detail about Goals and Principles of Protection. | 14M |
| | | (OR) | |
| 10. | | Write Short notes on (a) Logic Bomb, (b) Trap Door, (c) Trojan Horse. | 14M |

**Q.P. Code: 697421** | **SET - 1**

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
## B. Tech. IV Sem. (R15) Supple. Examinations of September/October 2020
***SUB: Java Programming (CSE)***

Time : 3 Hours | Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**
**All questions carry Equal Marks.**

**UNIT - I**

| | | | |
|---|---|---|---|
| 1. | (a) | Explain briefly buzzwords of java | 7M |
| | (b) | Explain briefly about method overloading with an example program. | 7M |
| | | (OR) | |
| 2. | (a) | Write briefly about OOP concepts. | 7M |
| | (b) | Explain about different access modifiers in Java | 7M |
| | | **UNIT – II** | |
| 3. | (a) | Explain the purpose of Super keyword with suitable example program | 7M |
| | (b) | Define Abstract class. Demonstrate Abstract class with an example program | 7M |
| | | (OR) | |
| 4. | (a) | Write a java program to demonstrate implementing interfaces | 7M |
| | (b) | Explain the use of this and final keywords with suitable examples | 7M |
| | | **UNIT – III** | |
| 5. | (a) | Explain the differences between Multithreading and Multitasking | 7M |
| | (b) | Explain the keywords throw and throws with suitable examples | 7M |
| | | (OR) | |
| 6. | (a) | Write a java program to demonstrate try and catch blocks | 7M |
| | (b) | Write a java program to implement threads using thread class | 7M |
| | | **UNIT – IV** | |
| 7. | (a) | Write a java program to implement mouse events | 7M |
| | (b) | Explain briefly about Delegation event model | 7M |
| | | (OR) | |
| 8. | (a) | Explain flow layout with an example program | 7M |
| | (b) | Write a java program to demonstrate buttons | 7M |
| | | **UNIT-V** | |
| 9. | (a) | Explain how to create tabbed panes with an example program | 7M |
| | (b) | Explain applet life cycle with an example | 7M |
| | | (OR) | |
| 10. | (a) | Explain various categories of repaint() methods | 7M |
| | (b) | Explain scroll panes with an example program | 7M |