Code No.: **30110/40110** **MR13/ MR14**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **STRENGTH OF MATERIALS-II**

Branch: **CE**

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

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Define modulus of rupture
2. Define effective length of a column.
3. Euler' s formula is not valid , if slenderness ration is less than_____
4. What is the ratio of hoop stress in cylinder to hoop stress in spherical shell?
5. Product of inertia of T-section about centroid axes is_____

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Draw torsional stress distribution of a circular section subjected to pure torsion
2. Write the assumption made in pure torsion?
3. What is effective length of a column?
4. Define the terms Euler's buckling load and slenderness ratio
5. Explain torsion factor of curved beams
6. In curved beams point of contra-flexure does not coincide with point of zero bending moment. Explain.
7. Write the expression for original difference in radii at junction of compound cylinder and explain terms.
8. Explain how compound cylinder is formed
9. Write the principle and uses of shear centre
10. What is unsymmetrical bending? What is the direction of neutral axis in unsymmetrical bending?

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. A close coiled helical spring made of round steel wire 6 mm diameter, having 10 complete turns is subjected to an axial moment M. Determine the magnitude of the axial couple M if the maximum bending stress in a spring wire is not to exceed 240 N/mm. Calculate also the angle through which one end of the spring is turned relative to the other end, if the mean coil radius is 3 cm E_{steel}= 200 kN/mm^2.

OR

2. A close coiled helical spring 100 mm mean diameter is made up of 20 turns of 10 mm diameter steel wire. If the maximum shear stress is not to exceed 90MPa, calculate the maximum axial load the spring can take and the stillness of the spring. What is the strain energy stored at maximum load? Take rigidity modulus as 0.8×10^5Mpa.
3. From the following data determine the thickness of C.I. column. Length of column = 6m, external diameter = 200mm, load = 500KN, Factor of safety = 6, assume fixed ends and ultimate compressive stress and Rankine's constant for hinged ends as 570MN/m^2 and 1/1600 respectively

OR

4. A hollow cylindrical cast iron column 5m long has both ends fixed. Determine the maximum diameter of the column if it has to carry a safe load of 250KN with a factor of safety of 3. Take the internal diameter as 0.8 times the external diameter Take fc = 550MPa and α = 1/1600. Use Rankine's formula.
5. A semi circular beam of radius R is simply supported on three equally spaced supports and carries a UDL W/m. Derive expression for maximum bending and twisting moment. Calculate maximum bending and twisting moment, if R= 8m and w=20kN/m.

OR

6. Find the maximum and minimum stress intensities at the base if a uniform circular chimney, 4m external diameter and 2m internal diameter, 20m high, subjected to a horizontal wind pressure of 2KN/m^2 of projected area. The density of masonry is 20KN/m^3.
7. A closed cylindrical vessel made of steel plates 4 mm thick with plane ends, carries fluid under pressure of 3 N/mm^2. The diameter of the cylinder is 25cm and length is 75 cm. Calculate the longitudinal and hoop stresses in the cylinder wall and determine the change in diameter, length and Volume of the cylinder. Take E = 2.1×10^5 N/mm^2 and 1/m = 0.286.

OR

8. A compound tube is made by shrinking a tube of 120mm and 90mm as external and internal diameter on to another tube of 60mm and 90mm at internal and external diameter. The shrinkage pressure at the junction is 12MPa. If fluid is admitted into compound tube at 30MPa pressure. Find the hoop and radial stresses over the thickness of compound tube.
9. A beam of T section flange 100mm x 20mm, web 150mm x 10mm is 2.5m in length and simply supported at the ends. It carries a load of 3.2KN inclined at 20 degrees to the vertical passing through the centroid of the section if E=200Gpa. (a)Maximum tensile stress. (b)Maximum compressive stress. (c)Deflection due to load. (d)Position of N.A.

OR

10. Determine the position of the shear centre for a channel section of 100 mm by 100 mm outside and 10 mm thick.

Code No.: **30M10/40M05** **MR13/ MR14**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **PROBABILITY & STATISTICS**

Branch: **CE**

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

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Define a Discrete Random Variable.
2. Write Rank Correlation formula.
3. What is meant by Standard Error?
4. Define steady states.
5. Define Stochastic matrix.

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. The random variable X has the following probability distribution:

x	-2	-1	0	1
F(x)	0.4	K	0.2	0.3

Find k and the mean value of x.

2. If X is a random variable follows normal distribution with mean10 and variance 4 then find p(X =11).
3. Define Joint density, Marginal density functions.
4. Write multipleCorrelationfor three variables formula.
5. What is Chi-Square test of goodness of fit?
6. Assume that σ=20.0, how large a random sample be taken to assert with probability 0.95 that the sample mean will not differ from the true mean by more than 3.0 points?
7. If average number arrivals is 4 per hour and average number of services is 6 per hour then find the probability that a new arrival need not wait for the service.
8. State the assumptions under which an arrival process is a Poisson process
9. What is a Stochastic matrix? When is it said to be regular?
10. Test the matrix $\begin{bmatrix} 1 & 0 \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$ is stochastic or not.

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. In a certain factory turning out razor blades, there is a small chance of 0.002 for any blade to be defective. The blades are supplied in packets of 10, use Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 10,000 packets.

OR

2. Fit a poisson distribution to the following data

X	0	1	2	3	4	5
f	142	156	69	27	5	1

3. Calculate Karl Pearson's correlation coefficient for the following paired data. What inference would you draw from the estimate?

X	28	41	40	38	35	33	40	32	36	33
Y	23	34	33	34	30	26	28	31	36	38

OR

4. In a partially destroyed laboratory data, only the equations giving the two lines of regression are available and are $7x - 16y + 9 = 0$ and $5y - 4x - 3 = 0$. Calculate the coefficient of correlation and the means of X and Y.
5. The following table shows the distribution of digits in the numbers chosen at random from a telephone directory:

Digit	0	1	2	3	4	5	6	7	8	9	Total
Frequency	1026	1107	997	996	1075	933	1107	972	964	853	10,000

Test whether the digits may be taken to occur equally frequently in the directory.

OR

6. Experience had show that 20% of a manufactured product is of the top quality. In one day production of 400 articles only 50 are top quality. Test the hypothesis at 0.05 level.
7. A duplicate machine maintained for office use is operated by an office assistant who earns Rs 5 per hour. The time to complete each job varies according to an exponential distribution with mean 6min. Assume a Poisson input with an average arrival rate of 5jobs per hour. If an 8-h day is used as a base, determine: a) The percentage idle time of the machine (b) the average time a job is in the system and (c) the average earning per day of the assistance.

OR

8. Barber A takes 15 minutes to complete a haircut. Customers arrive in his shop at an average rate of one every 30 minutes. Barber B takes 25 minutes to complete one haircut and customers arrive at his shop at an average rate of one every 50 minutes. The arrival processes are Poisson and the service times follow an exponential distribution. a) Where would you expect a bigger queue. b) Where would you require more time waiting included to complete a haircut?
9. A man either drives a car or catches a train to go to office each day. He never goes 2 days in a row by train but if he drives one day, then the next day he is just as likely to drive again as he is to travel by train. Now suppose that on the first day of the week, the men tossed a fair dice and drove to work if and only if a 6 appeared. Find (i) the probability that he takes a train on the third day and (ii) the probability that he drives to work in the long run.

OR

10. An urn initially contains five black balls and five white balls. The following experiment is repeated indefinitely: A ball is drawn from the urn. if the ball is white it is put back otherwise it is left out . Let X_n be the no of black balls remaining in the urn after n draws from the urn. Is Xn a Markov process? If so find the appropriate transition probabilities.

Code No.: 30111/40111 | MR13/ MR14

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: Structural Analysis-I

Branch: **CE**

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

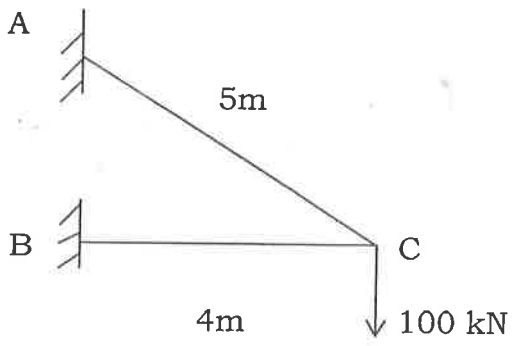
PART – A

I. Answer all the following. **(5x1=5)**

1. Method of joints is applicable if the number of unknown forces not more than _____.
2. Write expression for strain energy for a beam due to bending.
3. Define the Static indeterminacy of a beam?
4. Sum of distribution factors at a joint in moment distribution method is _____.
5. Draw a sketch of a pratt truss.

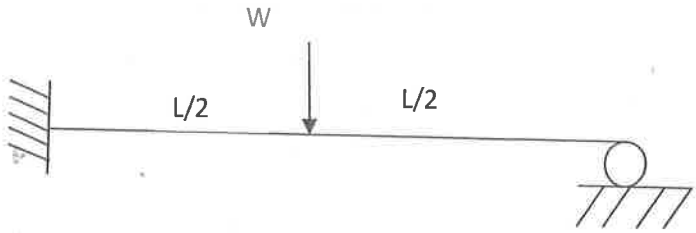
II. Answer all the following. **(10x2=10)**

1. Find out the forces in the members AC & BC of the truss shown below,



2. Write about the assumptions made in applying method of sections in analysis of pin jointed trusses.
3. State and explain the Castigliano's theorem – I.

4. A three hinged semicircular arch is subjected to a load of 100 kN at a section where the radius vector makes an inclination of 30° with the level of springing. Find the horizontal thrust.
5. Find out the prop reaction of the beam shown below.



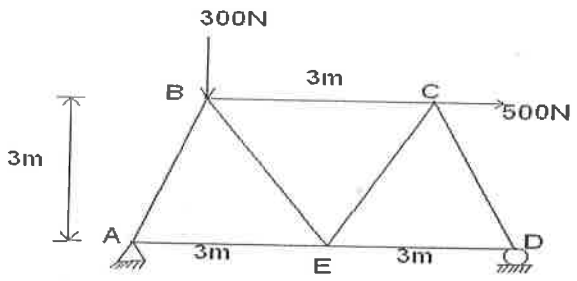
6. Moments at the ends of a fixed beam with an udl 'w' over entire span 'L' is _____.
7. Using moment distribution method, draw BMD for the beam shown.

8. Write briefly about Clapeyron's theorem of three moments.
9. A wheel load of 100 kN moves from left to right on s/s girder of span 10m. Determine the maximum moment at a section 7m from the left support.
10. Draw a max BMD for a s/s beam of span 'L' with a concentrated central point load 'W'.

PART –B

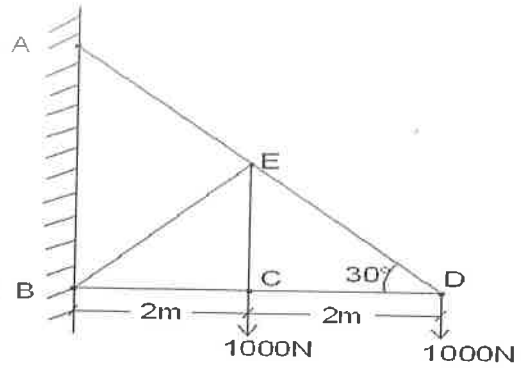
III. Answer all the following. **(5x10 = 50)**

1. A truss of span 6m is loaded as shown in *Fig.*below, find the forces in the members AB, BC, CE and DE.



(OR)

2. Using tension coefficients method, analyse the Cantilever truss of 4m long as loaded shown in *Fig.* Find the forces in all members.



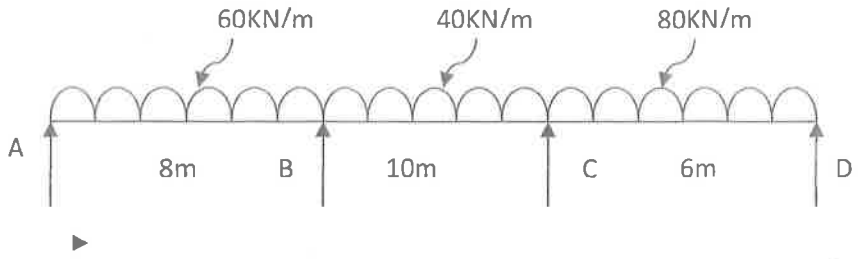
3. Using Castigliano`s theorem find the slope and deflection at the free end of a cantilever of length L, carrying a u.d.l. of "w" per m run over entire span.

(OR)

4. A three hinged parabolic arch of span 40 m and rise 5 m carries a uniformly distributed load of intensity 20 kN/m over left half of the span and a point load of 50 kN at 10 m from the right support. Find the bending moment, normal thrust and radial shear at left quarter span point. Also draw the Bending Moment diagram.
5. A propped cantilever of span 8 m carries a u.d.l of 24kN/m acting over a length of 5m starting from its fixed end. Construct the shear force and bending moment diagrams for the beam showing all important values on them.

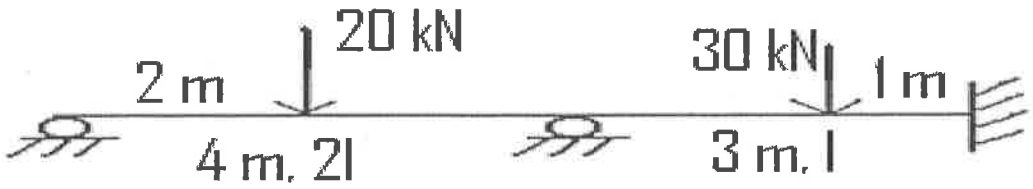
(OR)

6. A fixed beam of span 6 m carries a point load of 10kN at 4 m from left support. Find the fixed and moments and sketch the B.M and S.F diagrams marking the salient values.
7. A continuous beam consists of 3 successive spans of 8 mts, 10 mts and 6 mts and carries loads of 60KN/m, 40 KN/m and 80 KN/m respective on the spans. Determine the B.M and reactions at the supports and draw the bending moment diagram.



(OR)

8. Analyze the beam shown in fig. using slope – deflection method and draw S.F.D. and B.M.D.



9. Two concentrated rolling load of 12 and 6 kN placed 4.5 m apart travel along a freely supported girder of 16 m span. Sketch the graphs of maximum shearing force and maximum bending moment and indicate the position and magnitudes of the greater value.

(OR)

10. Four wheel loads 100, 120, 150 and 80 kN spaced equally 2 m apart cross a simply supported girder of span 25 m with 100 kN load leading. Determine the max. B.M. at a section 5 m from left support. Also determine absolute max. B.M. and S.F in the girder.

Code No.: **30108/40108** | **MR13/ MR14**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **Hydraulics and Hydraulic Machinery**

Branch: **CE**

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

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. A person who is standing nearby a river threw a stone into river. The person observed that a group of circular waves formed in water and they travel in upstream as well as downstream side. What is the type of flow?
2. You are trying to model a river in laboratory. Do you think, a perfect similitude is achieved for this model?
3. In a curved vane, when do you get maximum efficiency
4. Define hydraulic efficiency?
5. A person wanted high flow rate for irrigating his land but confused to select parallel or series connected impellers for his requirement? What do you advice?

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Draw velocity distribution for flow in an open channel
2. What is back water curve? Where does it occur?
3. What are the different forces that may consider while modeling a fluid system
4. How do you identify scale effect in modeling?
5. Draw an unsymmetrical vane and indicate inlet tip, outlet tip, deflection angle when jet is striking one end of the vane
6. In what way, the reaction turbines are different from tangential flow turbines, Explain with reference to energy conversion.
7. What is draft tube? What are its functions?
8. Explain angular momentum principle? What type of applications, it is being used.
9. Explain, in what way a pump is different from turbine?
10. What is priming? Why it is required in pumps?

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. (a) what is the fundamental difference between flow through pipe and flow through channel? 5M
   (b) A circular channel of 50 cm diameter carries water at the rate of 0.4 m^3 /s, find the gradient of channel for maximum velocity?

OR

2. (a) Define specific energy and draw specific energy diagram. Explain, how it is useful for the open channel flows.
   (b) Hydraulic jump taking place in a horizontal rectangular channel, the Froude number before the jump is 10 and energy loss during the jump is 4 m. Find (i) Depth before and after the jump (ii) Discharge (iii) Froude number after the jump.

3 (a) what do you understand by similarity? Mention various similarities which are to be maintained for model testing.

(b) A 5:1 scale model of a car is tested in wind tunnel. The velocity with prototype is 75 KMPH. The model drag is 300 N. Find out the drag and power required for prototype. The air is used with model as well as prototype also.

OR

4. (a) Distinguish between undistorted model and distorted model. Mention a few distorted models.

(b) The frictional pressure loss per unit length of the pipe is dependent on density of fluid, diameter of pipe, velocity of flow, viscosity of fluid and roughness of pipe. By using dimensional analysis and Buckingham pi theorem, prove the loss of head is given by $h_L = (4flv^2)/2gd$

5. (a) Derive the expression for work done by a jeyt of water impinging on a series of moving vanes. Also prove that in this case, the efficiency is maximum when $u = U/2$

(b) The inclination of a jet of water 50 mm dia and having a velocity 30 m/s is 30^0 to the horizontal. It enters a fixed curved vane tangentially and is diverted by 130^0. Find the horizontal and tangential pressure forces on the vane.

OR

6. (a) State the conditions when efficiency of blades may be 100 percent or more. Also state the shape of blade?

(b) A jet of water impinges a series of moving plates tangentially with a velocity of 50 m/s resulting in the movement of plates at a speed of 12 m/s. Find (i) The work done per kg of water/s (ii) Efficiency of the plates.

7. (a) what do you mean by characteristic curves of a turbine? Discuss different operating characteristic curves for reaction turbine.

(b) Francis turbine running at 400 RPM when head available is 60 m. The inner and outer dia are 50 cm and 100 cm respectively. The velocity of the flow through the runner is 10 m/s and hydraulic efficiency is 80%. Determine the inlet and outlet blade angles of rotating blades.

OR

8. (a) what are constant efficiency curves? What are the benefits derived from these curves.

(b) A pelton wheel is supplied water at a rate of 10 lit/s under a head of 49 m, and its mean bucket speed is 15 m/s. Coefficient of velocity of the nozzle is 0.98 and water is deflected through an angle of 160^0 through bucket. Determine power developed when there is no frictional loss in buckets and there is a 10% frictional loss in buckets.

9. (a) Explain principle of working of a centrifugal pump with a neat sketch.

(b) A centrifugal pump delivers oil at a rate of 100 lit/s against a pressure of 500 kpa. If the over all efficiency of the pump is 0.7, find the power required to drive the pump. Take specific gravity of oil is 0.8

OR

10.(a) Define the following terms (i) Gross head (ii) Load factor (iii) Capacity factor

(b) A centrifugal pump requires 6.5 kw power when running at 1440 RPM and delivering a total head of 15 m. Find out the head developed and power required when the pump runs at 1000 RPM

Code No.: 30230/40230 | MR13 & MR14

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **Basic Electrical And Electronics Engineering**

Branch: **Common to CE & MINING**

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

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. What is the Efficiency of the Maximum Power transfer theorem?
2. Define a Transformer.
3. Define armature winding?
4. What is the Rectifier?
5. Write the equation for the Deflection Sensitivity of the CRT?

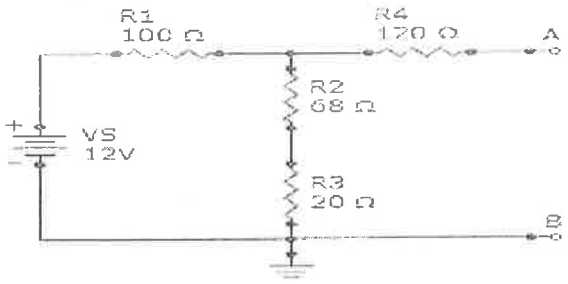
II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. The current in a 2 Henry inductor varies at a rate of 2A/sec. Find the voltage across the inductor and the energy stored in the magnetic field at 2A.
2. Two resistors of 4 Ω and 6 Ω are connected in parallel. If the total current is 30A, find the current through each resistor
3. A transformer has a 1:6 turns ratio and a secondary coil load resistance of 470 Ω. The load resistance as seen by the source is ____ .
4. Write down the relationship between MMF and flux.
5. Write the condition for the Maximum power in the DC Motor?
6. Explain the motor principle
7. Write principle of operation of the Half Wave Rectifier?
8. Define zener breakdown.
9. What are the major parts of the CRT?
10. Write the equation for Deflection for a CRT.

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. Find the Thevenin equivalent (V_{TH} and R_{TH}) between terminals A and B of the circuit given.



OR

2. State and prove maximum power transfer theorem.

3. In a 25-KVA, 2000/200V, single phase transformer. the iron and full-load copper losses are 350 and 400W respectively. Calculate the efficiency at unity power factor on (i) full load (ii)half-full load.

OR

4. a) Write and explain the condition for maximum efficiency of a transformer.
   b) A single phase 2200/50V, 50Hz transformer has a net core area of 36 cm^2 and a maximum flux density of 6Wb/m^2 . Calculate the number of turns of primary and secondary

5. Explain the principle of operation of a.c generator?

OR

6. Classify the different types of DC motors and derive the torque expression for DC motor

7. a) Explain the effect of temperature on Volt-Ampere characteristics of a diode?
   b) Give a Schematic diagram of SCR and explain its characteristics and applications.

OR

8. A half wave rectifier, having a resistive load of 1000Ω and alternating voltage of 325V peak value and diode has a forward resistance of 100Ω. Calculate a) Peak, average and RMS value of current. b) DC power output. c) AC input power d) Efficiency of rectifier.

9. Explain the working of RC-Phase shift oscillators with transistor.

OR

10. a) Write down the application of oscillations? [3+7]
    b) Write down the advantages of RC-phase shift oscillator with transistor