Code No: 2923/AICTE

FACULTY OF ENGINEERING

BE (AICTE)(Civil) IV-Semester (Main) Examination, December 2020

Subject: Materials Testing and Evaluation

Time: 2 Hours **Max .Marks: 70**

Note: (Missing data if, any can be assumed suitable).
Use of IS : 10262 is permitted.

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1 What are the Chemical classifications of rock?
2 What are the three types of classifications of common bricks?
3 Mention Bogue's compounds.
4 What are the types of cement?
5 What are different types of mineral admixtures?
6 State workability.
7 How impurities in water effects properties of concrete?
8 What is pointing?
9 What are different types of floors?
10 State tests for hardened concrete.

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11 Enumerate the characteristics to be considered for selection of stone for various civil engineering works.
12 What are the field tests to find the suitability of bricks for construction?
13 Discuss the difference between the wet and dry process of manufacturing of Portland cement.
14 Explain Classification of aggregates. What are the characteristics of aggregates?
15 What are different types of admixtures? Explain in detail about chemical admixtures.
16 Design M25 grade concrete using IS 10262 method of mix design for the following data:
(i) Size and shape of aggregate: 20 mm angular
(ii) Exposure condition: severe
(iii) Minimum cement content: 320 kg/m3
(iv) Maximum free water cement ratio: 0.55
(v) Degree of supervision: good
(vi) Maximum cement content: 450 kg/m3
(vii) Specific gravity of cement: 3.15, fine aggregate: 2.7, coarse aggregate: 2.74
(viii) Water absorption: Coarse aggregate: 1.0%, fine aggregate: 1.5%
(ix) Fine aggregate conforming to zone II
17 Write short notes on any two of the following
a) Paints and varnishes
b) Bitumen
c) Industrial waste products

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Code No. 2926/AICTE

FACULTY OF ENGINEERING

B. E.IV – Semester (AICTE) (EE/Inst.) (Main) Examination, December 2020

Subject: Power Electronics

Time: 2 hours **Max. Marks: 70**

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1. Differentiate between MOSFET and IGBT.
2. Define latching current and holding current of SCR.
3. Differentiate between controlled and uncontrolled rectifier.
4. Give the output voltage equation of single phase half wave converter with R load.
5. Give the applications of chopper.
6. Give the output voltage equation of buck-boost chopper.
7. What is an inverter? Give its applications.
8. What is Total Harmonic Distortion? Give its equation.
9. Compare VSI and CSI.
10. Give the relationship between output voltage and modulation index of 3-ϕ inverter.

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11. (a) What do you mean by firing circuit of SCR? Explain RC firing circuit of SCR in detail?

    (b) Explain the operation of IGBT with Voltage – Current (VI) characteristics. What do you mean by latching in IGBT? Is latching desirable in IGBT? Why/Why Not?

12. (a) With neat sketch and waveforms explain the operation of three phase fully controlled converter with RL load. Derive the relevant equations.

    (b) A single phase fully controlled converter with R load is connected to 230V 50Hz supply. Compute the firing angle that is required to produce an output voltage of 130V. What will be the rms voltage at this firing angle?

13. (a) Explain the operation of single phase AC voltage controller for RL load with neat circuit diagram and waveforms. Derive the relevant equations.

    (b) Explain the operation of buck converter with neat circuit, waveforms and derive the output voltage equation.

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14. (a) What is sinusoidal pulse width modulation schemes? Differentiate between unipolar and bipolar SPWM technique.

    (b) Explain the operation of single phase SPWM inverter and obtain the output voltage equation in terms of modulation index.

15. (a) Explain the operation of 3-ϕ voltage source inverter under 120^0 mode of operat

    (b) Explain the bipolar sinusoidal PWM technique used in 3-ϕ inverter.

16. (a) Explain the various control techniques used in chopper.

    (b) Explain the switching characteristics of SCR and define, T_{on} and T_{off} of SCR.

17. (a) Explain the operation of BJT with neat circuit and characteristics.

    (b) A buck chopper is operating at a frequency of 2 KHz on 220V dc supply. If the load voltage is 170V compute the conduction and blocking period of the chopper.

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Code No: 2935/AICTE

FACULTY OF ENGINEERING

B.E. IV - Semester (AICTE) (ECE) (Main) Examination, December 2020

Subject : Pulse and Linear Integrated Circuits

Time: 2 Hours **Max. Marks: 70**

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1. Define Rise time. Give the relation between Rise time and Bandwidth.
2. Justify that a clamping circuit is a dc inserter.
3. Distinguish between Stable state and a Quasi Stable state in a Multivibrator?
4. How can a linearly varying current waveform be generated
5. List the AC characteristics of op-amp.
6. Define CMRR of an op-amp
7. Explain the significance of precession rectifier.
8. State the need of signal conditioning.
9. List the applications of 555 timer in A stable mode of operation.
10. What are the applications of ADC?

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11. (a) Draw the RC Low pass circuit. With necessary waveforms and expressions explain its working for step input
    (b) Design a diode clamper to restore a dc level of + 5V to an input signal of peak-to-peak valve 15V. Assume the drop across the diode as 0.7V

12. (a) Draw and explain the circuit of Astable Multivibrator with necessary waveforms

    (b) Derive the expressions for e_s, e_d, e_t of a exponential sweep circuit

13. (a) Explain in detail all the DC characteristics of an ideal OP-AMP with relevant expressions
    (b) Draw and explain the equivalent circuit of an operational amplifier

14. (a) Explain the working of Non-Inverting amplifier and derive the equation of its Gain
    (b) Draw the neat diagram of log-antilog amplifiers and explain its operation.

15. (a) With a neat diagram explain the working principle of R-2R ladder type DAC.
    (b) Explain working of PLL using appropriate block diagram.

16. (a) Derive the relation between the tilts in the forward and reverse directions of the output of a clamping circuit excited by a square – wave input
    (b)With the help of a near circuit diagram, explain the working of a transistor Miller time base generator?

17. Write Short notes on
    (a) Compensation techniques of OP-Amp
    (b) Fixed and variable voltage regulators

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Code No. 2940/AICTE

FACULTY OF ENGINEERING

B.E. IV-Semester (AICTE)(M/P/AE)(Main) Examination, December 2020

Subject: KINEMATICS OF MACHINERY

Time: 2 Hours **Max. Marks: 70**

Note: (Missing data if, any can be assumed suitable).

PART – A

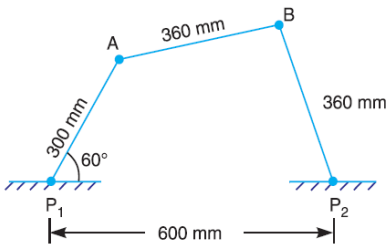
Answer any five questions. **(5 x 2 = 10 Marks)**

1. Give the classification of kinematic link.
2. What are the types of Instantaneous centres?
3. State the laws of
   a) Static friction b) Dynamic friction
4. Define the following terms as applied to cam with a neat sketch
   a) Base circle b) Stroke of the follower
5. State and prove the law of gearing.
6. Explain the following terms:
   a) Lower pair b) Kinematic chain
7. Draw the Space and acceleration diagram of a slider crank mechanism.
8. Explain briefly about design of a disc clutch with neat sketch.
9. Explain with sketches the different types of cams and followers.
10. What do you understand by 'gear train'? Discuss the various types of gear trains.

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11. a. Explain about Robert's mechanism with a neat sketch.
    b. The angle between the axes of two shafts connected by Hooke's joint is 18°. Determine the angle turned through by the driving shaft when the velocity ratio is maximum and unity.
12. The dimensions and configuration of the four bar mechanism, shown in figure, are as follows :
    P_1A = 300 mm; P_2B = 360 mm; AB = 360mm, and
    P_1P_2 = 600 mm. The angle AP_1P_2= 60°. The crank
    P_1A has an angular velocity of 10 rad/s and an angular acceleration of 30 rad/s^2, both clockwise.
    Determine the angular velocities and angular accelerations of P_2 B, and AB and the velocity and acceleration of the joint B.



13. The simple band brake, as shown in figure, is applied to a shaft carrying a flywheel of mass 400 kg. The radius of gyration of the flywheel is 450 mm and runs at 300 R.p.m. If the coefficient of friction is 0.2 and the brake drum diameter is 240 mm, find :

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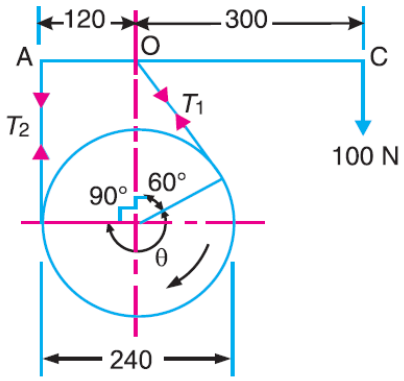
1. the torque applied due to a hand load of 100 N,
2. the number of turns of the wheel before it is brought to rest, and
3. the time required to bring it to rest, from the moment of the application of the brake.



All dimensions in mm.

14. A cam, with a minimum radius of 25 mm, rotating clockwise at a uniform speed is to be designed to give a roller follower, at the end of a valve rod, motion described below :
    1. To raise the valve through 50 mm during 120° rotation of the cam ;
    2. To keep the valve fully raised through next 30°;
    3. To lower the valve during next 60°; and
    4. To keep the valve closed during rest of the revolution i.e. 150° ;

    The diameter of the roller is 20 mm and the diameter of the cam shaft is 25 mm.
    Draw the profile of the cam when the line of the stroke is offset 15 mm from the axis of the cam shaft. The displacement of the valve, while being raised and lowered, is to take place with simple harmonic motion. Determine the maximum acceleration of the valve rod when the cam shaft rotates at 100 r.p.m.
    Draw the displacement, the velocity and the acceleration diagrams for one complete revolution of the cam.
15. An internal wheel B with 80 teeth is keyed to a shaft F. A fixed internal wheel C with 82 teeth is concentric with B. A compound wheel D-E gears with the two internal wheels; D has 28 teeth and gears with C while E gears with B. The compound wheels revolve freely on a pin which projects from a disc keyed to a shaft A co - axial with F. If the wheels have the same pitch and the shaft A makes 800 r.p.m., what is the speed of the shaft F? Sketch the arrangement.
16. Two mating gears have 20 and 40 involute teeth of module 10 mm and 20° pressure angle. The addendum on each wheel is to be made of such a length that the line of contact on each side of the pitch point has half the maximum possible length.
    Determine the addendum height for each gear wheel, length of the path of contact, arc of contact and contact ratio.
17. a.) In a flat belt drive the initial tension is 2000 N. The coefficient of friction between the belt and the pulley is 0.3 and the angle of lap on the smaller pulley is 50°. The smaller pulley has a radius of 200 mm and rotates at 500 R.p.m. Find the power transmitted by the belt.

    b.) A single plate clutch, effective on both sides, is required to transmit 25 kW at 3000 r.p.m. Determine the outer and inner radii of frictional surface if the coefficient of friction is 0.255, the ratio of radii is 1.25 and the maximum pressure is not to exceed 0.1 N/mm^2. Also determine the axial thrust to be provided by springs. Assume the theory of uniform wear.

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Code No. 2947/AICTE

FACULTY OF ENGINEERING

B.E. (CSE) (AICTE) IV-Semester (Main) Examination, December 2020

Subject : Database Management Systems

Time : 2 Hours **Max. Marks: 70**

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1 List out the three levels of Data Abstraction along with a neat diagram.
2 Show how to create a View in SQL with an example.
3 Explain the difference between week entity set and strong entity set.
4 Classify the types of integrity constraints on a single relation.
5 Demonstrate transitive dependency with an example.
6 Explain in what circumstances a transaction is rolled back.
7 What is static hashing?
8 What is the main idea of shadow paging technique?
9 Differentiate between two phase locking and rigorous.
Two phase locking protocols.
10 What is meant by log based recovery?

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11 (a) Illustrate with a neat diagram of Database Architecture.
(b) List out the different types of users in a database system.

12 (a) Demonstrate the fundamental relational algebra operations.
(b) Consider the following relations and the query.
student(SID, name, section);
course(CID, Title);
takes (SID, CID, section);
select * from student natural full outer join takes natural full outer join course;
Under what circumstances would the query include tuples with Null values for the *title* attribute?

13 (a) Explain about the need of authorizing parts of a database and demonstrate grant command with examples.
(b) Demonstrate Boyce Code Normal form with examples.

14 (a) Differentiate static hashing and dynamic hashing with examples.
(b) Differentiate between sparse and dense indexing techniques. Explain with examples.

15 (a) Explain about strict two phase locking protocol with a neat diagram.
(b) Discuss in detail on testing for serializability.

16 (a) Explain in detail about Recoverability in DBMS.
(b) Illustrate the steps in ARIES algorithm.

17 Write short notes on:
(a) Weak Entities
(b) Aggregation
(c) Assertions

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Code No. 2951 / AICTE

FACULTY OF ENGINEERING

B.E. (I.T) (AICTE) IV – Semester (Main) Examination, December 2020

Subject: Computer Organization and Microprocessor

Time: 2 Hours **Max.Marks: 70**

Note: (Missing data if, any can be assumed suitable).

PART – A

Answer any five questions. **(5 x 2 = 10 Marks)**

1 Give the operating modes of 8259A
2 Write the features of mode-0 in 8255
3 Draw the status word format for 8254
4 Define Computer Organization, Computer Architecture
5 What is Cache hit Ratio and Cache miss Ratio?
6 Draw the structure of general purpose multicomputer
7 What is Interrupt Service Routine in Microprocessor?
8 List few branch and call instructions
9 How effective address calculated in indirect addressing mode?
10 List the difference between RAM Vs ROM.

PART – B

Answer any four questions. **(4 x 15 = 60 Marks)**

11 Draw the architectural Diagram of 8085 microprocessor and list out the following:
   i) General purpose Registers
   ii) Special purpose Registers with their functions
   iii) Flags in the flag register with explanation.

12 What is DMA? Which Hardware pins are use of DMA control? Draw and explain the architecture of 8257 DMA controller.

13 a) Write 8085 Assembly Language program to sort on array of 10 bytes in descending order.
   b) Write 8085 Assembly Language Program to perform 32 bit Binary Addition.

14 Explain the block diagram of the 8279 keyboard/display interface and its operations.
15 Explain the sequence of events during the execution of CALL & RET instruction by 8085 microprocessor with the help of neat diagram
16 a) Distinguish between virtual memory and Cache memory. Write the merits and demerits of virtual memory.
   b) Give the neat sketch tht illustrates the components in a typical memory hierarchy.
17 a) What is the difference between serial and parallel transfer? Using a shift registers with parallel load, explain how to convert serial input data to parallel output and parallel output to serial output.
   b) Discuss the difference between tightly coupled multiprocessors and loosely coupled multiprocessors.

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