

**FACULTY OF ENGINEERING**

**B.E. IV – Semester (CBCS) (Civil/ECE/AE)(Supple) Examination, Dec-2018/Jan 2019**

**Subject: Environmental Sciences**

**Time: 3 Hours**

**Max. Marks: 70**

**Note: Answer all questions from Part A & Any FIVE questions from Part – B.**

**PART – A (2x10=20)**

- 1) What is the scope of Environmental Studies?
- 2) Deforestation: How severe is the Problem?
- 3) What are the affects of excess usage of ground water?
- 4) What are the different zones in lake Ecosystem?
- 5) With flow chart, enumerate the Structure of the Ecosystem?
- 6) What are Hotspots of Biodiversity?
- 7) What do you by Biogeochemical Cycles?
- 8) How can we control soil pollution?
- 9) In which regions of India acid rain has been recorded?
- 10) Classify solid waste.

**PART – B (5x10=50)**

**Answer any 5 questions**

- 11 Why it is necessary to create environmental awareness? 10
- 12 What are the major causes for conflicts over water? Discuss one international and one inter-state water conflict. 10
- 13 Why has nature evolved food webs in ecosystems instead of simple linear food chains? Explain. 10
- 14 Discuss the process of ecological succession. 10
15. What do NBPGR, NBAGR and NFPTCR stand for? Where are they located? Explain their responsibilities. 10
- 16 Is ozone layer depletion a threat to living beings? Explain. 10
- 17 What adverse effects can solid wastes cause? How can the solid waste be managed? 10

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## FACULTY OF ENGINEERING

BE (CBCS) (EEE) IV-Semester (Suppl.) Examination, Dec. 2018/Jan. 2019

Subject: Electrical Machines - I

Time: 3 Hours

Max. Marks: 70

*Note: Answer ALL questions from Part-A and any FIVE questions from Part-B***Part-A(20 Marks)**

- 1 What are the advantages of analyzing energy – conversion devices by field energy concept? 2
- 2 A linear magnetic circuit has flux linkages of 1.2 wb-turns when a current of 10A flows through its coil. Find the energy stored in the magnetic field of this coil 2
- 3 What is the Commutator pitch of a 4 pole DC armature having 49 Commutator bars? 2
- 4 An 8 pole, wave wound armature has 600 conductors and is driven at 625 rpm. If the flux per pole is 20mWb, determine the generated emf. 2
- 5 List the conditions to be satisfied for operating the d.c. generators in parallel. 2
- 6 Why a differentially compound motor is not used in practice? 2
- 7 Enumerate the factors on which speed of a d.c. motor depends. 2
- 8 To what polarity the interpoles excited in dc motors? 2
- 9 Define the following terms: constant power drive and constant torque drive. 2
- 10 A 480 V, 20kW, shunt motor of draws 2.5A, when running at with light load. Taking the armature resistance to be  $0.6\Omega$ , field resistance to be  $800\Omega$  and brush drops at 2V and find full load efficiency. 2

**Part-B (50 Marks)**

- 11 a) Describe the principle of energy –conversion. From a consideration of the various energies involved, develop the model of an electromechanical energy-conversion device. 5
- b) For a linear magnetic circuit, derive the following relations for the stored magnetic energy  $W_{fld}$  and  $W'_{fld}$ . 5

$$W_{fld} = W'_{fld} = \frac{1}{2} FW = \frac{1}{2} \left\{ i = \frac{1}{2} W^2 Rl = \frac{1}{2} \frac{lW^2}{2\Delta} = \frac{1}{2} \frac{F^2}{Rl} = \frac{1}{2} Li^2 \right.$$

Hence show that the magnetic stored energy density  $\check{S}_{fld} = \frac{1}{2} \frac{B^2}{\mu_0} \text{ joules/m}^3$

- 12 a) What are the two functions of a commutator in d.c. machines? Explain how the commutator keeps the armature m.m.f. stationary in space, along the interpolar axis, even though the armature rotates. 5
- b) A 200kW, 400V, 14-pole d.c. machine has a lap wound armature with 1100 conductors. The pole are to pole-pitch ratio is 0.7 Compute the number of pole face-conductors of the compensating winding in each pole, so as to obtain uniform air-gap flux density under the pole faces. 5

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- 13 The open circuit characteristic for a d.c. shunt generator at 800 r.p.m is given by the following data:

$I_f$ amp	0	0.2	0.4	0.65	1.02	1.75	3.15	5.00
$E_g$ volts	10	40	80	120	160	200	240	260

Determine the critical field resistance at

- a) 800 r.p.m. and  
 b) 900 r.p.m  
 c) If the field winding resistance is  $55\Omega$  find the range of field rheostat to vary the voltage from 200 V to 250 V, on open circuit at a speed of 800 r.p.m  
 d) Determine the terminal voltage and field current of the generator for a total armature resistance of  $0.6\Omega$ , armature current of 50A and a speed of 800 r.p.m. Neglect armature reaction 10
- 14 a) Describe and compare the various methods of speed control of D.C. motors. 5  
 b) A d.c series motor, running a fan at 1000 r.p.m takes 50A from 250V mains The armature plus field resistance is  $0.6\Omega$  If an additional resistance of  $4.4\Omega$  is inserted in series with the armature circuit, find the motor speed in case the field flux is proportional to the armature current. 5
- 15 a) In back to back test on a 250 V shunt machines, the line current was 50 amps(not including the field currents of 6 amps and 5 amps) and the motor current is 400 amps. The armature resistance of each machine was 0.015 ohm. Calculate the efficiency of each machine. 5  
 b) Determine the efficiency of each individual d.c. Series machine when they are mechanically coupled. 5
- 16 a) A 250V d.c shunt motor has an armature current of 20A when running at 1000 r.p.m against some load torque. The armature resistance is 0.5 and brush contact drop is 1V per brush. By how much must the main flux be reduced to raise the speed by 50% if the developed torque is constant? Ignore effects of armature reaction and magnetic saturation. 5  
 b) Explain why the e.m.f generated in the armature of a d.c. motor is called "back e.m.f" and explain the significance of back e.m.f 5
- 17 Explain any two from the following 10  
 a) Armature reaction  
 b) External and internal characteristics of d.c. generators  
 c) Discuss the effect of speed and size on the efficiency of D.C. machines

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## FACULTY OF ENGINEERING

B.E IV-Semester (CBCS)(Inst) (Suppl.) Examination, Dec. 2018 / Jan. 2019

Subject : Signal and Systems

Time : 3 Hours

Max. Marks : 70

*Note : Answer all questions from Part-A & Any five questions from Part-B*

### Part –A (20 Marks)

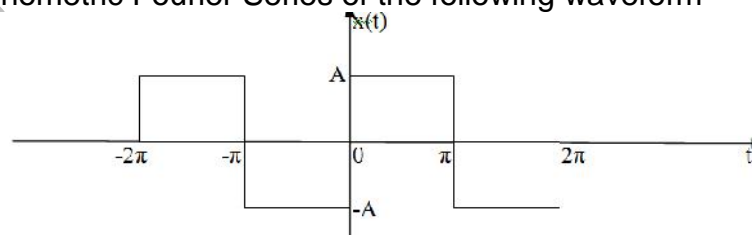
1. Find the even and odd part of the signal  $x(t) = e^{2t}u(t-1)$ . 2
2. Find out whether the signal is Periodic or not  $x(t) = e^{j4ft}$ . 2
3. Write the relationship between Trigonometric and Exponential Fourier series. 2
4. Explain the Dirichlet's Conditions for Convergence of Fourier Series. 2
5. Prove the Frequency shifting property of Fourier Transform. 2
6. Find the Fourier Transform of  $x(t) = e^{-at} \cdot u(t)$  for  $a > 0$ . 2
7. Find the Laplace Transform of signal  $x(t) = e^{at} \cdot u(t)$ . 2
8. Explain the relation between Laplace Transform and Fourier Transform. 2
9. Find Z-transform of signal  $h(n) = (-1)^n 3^{-n} u(n-1)$ . 2
10. Define the Region of Convergence of Z-transform. 2

### Part –B (50 Marks)

11. State whether the following system is 10  
 i) Static/Dynamic ii) Linear/Non Linear iii) Causal/Non Causal  
 iv) Time variant/Time Invariant

$$\frac{d^3 y(t)}{dt^3} + 4 \frac{d^2 y(t)}{dt^2} + 5 \frac{dy(t)}{dt} + 2y^2(t) = x(t+5)$$

12. Find the Trigonometric Fourier Series of the following waveform 10



13. a) Determine the Fourier Transform of  $x(t) = \cos \check{S}_0 t$  5  
 b) Find Fourier transform of sigmoid function. 5
14. a) Find Laplace Transform of the given Parabolic Function  $x(t) = t^2 \cdot u(t)$  4  
 b) Find the step response of the following system 6

$$H(s) = \frac{(s+3)}{(s^2 + 6s + 8)}$$

15. a) State and prove Initial value theorem of Z-Transform. 4  
b) Find Inverse Z-Transform of 6  
$$X(z) = \frac{3z^{-1}}{(1-z^{-1})(1-2z^{-1})}; ROC; |z| > 2$$
- 16 Consider a stable LTI system characterized by the differential equation 10  
$$\frac{dy(t)}{dt} + 2y(t) = x(t)$$
. Find its impulse response when the initial conditions are  
$$y(0+) = 1, y'(0+) = \left( \frac{dy(t)}{dt} / t = 0 \right) = 2.$$
17. Write short notes on 10  
a) Sampling Theorem  
b) Orthogonal Signal Space

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**FACULTY OF ENGINEERING****BE (M/P) IV- Semester (CBCS) (Suppl.) Examination, Dec. 2018/Jan. 2019****Subject : Design of Machine Elements****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part-A and any Five questions from part-B.****Part-A (20 Marks)**

- 1 What is meant by "Stress Concentration"?
- 2 How the shaft/axle is designed when it is subjected to bending moment only?
- 3 What is the difference between Caulking & Fullering? Explain with help of neat sketches
- 4 How does the working of compression coupling differ from that of a muff coupling?
- 5 What is a key? How are the keys classified? Draw neat sketches of different type of keys.
- 6 How do you get the factor of safety by using soderberg's line?
- 7 What are the advantages of welded joints when compare with Riveted joints?
- 8 Explain briefly about the classification of engineering design
- 9 Discuss the procedure for the design of eccentric loaded welded joint with neat sketches.
- 10 Define the term ' Bearing pressure intensity.

**Part-B (50 Marks)**

11. A shaft made of cast steel is required to transmit 75 kW at 300rpm. The supported length of the shaft is 3 metres. It carries two pulleys each weighing 1500N supported at a distance of 1 metre from the ends. Respectively. Assuming the safe value of stresses determine the diameter of the shaft.
- 12 Describe design procedure for sleeve and cotter joint with neat sketches
- 13 Design a flexible flange coupling of bush type to transmit 3 k W power at 960 rpm with a service factor of 1.2 Assume design stresses as  
For shaft, bolt, key in shear =  $50 \text{ N/mm}^2$   
For coupling in shear =  $20 \text{ N/mm}^2$   
For key in crushing =  $100 \text{ N/mm}^2$
- 14 A bolt is subjected to a load of 10 kN together with a transverse shear force of 5 kN Determine the diameter of bolt required according to
  - a) Maximum Principal stress theory
  - b) Maximum shear stress theory
  - c) Maximum principal strain theory
  - d) Maximum strain energy theory
  - e) Maximum distortion energy theory
- 15 Design a double riveted butt joint with two cover plates of 20 mm thick is made with 25 mm diameter rivets at 100 mm pitch. The permissible stresses for tensile, shear and crushing are 120MPa, 100 MPa and 150 MPa respectively. Find also the efficiency of the joint? Take the strength of rivet in double shear as twice than that of single shear.

- 16 A circular cross section rod is subjected to alternating tensile forces varying from a minimum of 200 kN to a maximum, of 500 kN. It is to be manufactured of a material with an ultimate tensile strength of 900 MPa and a endurance limit of 700 MPa. Find the diameter of rod using safety factors of 3.5 related to ultimate tensile strength and 4 related to endurance limit and a stress concentration factor of 1.65 for fatigue load. Use Goodman straight line as basis for design.
- 17 Write short notes on with a diagram for design:
- Factors affecting the fatigue strength
  - Power screws
  - Notch sensitivity
  - Chain drives

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**FACULTY OF ENGINEERING****B.E. IV-Semester (CBCS) (CSE) (Suppl.) Examination, Dec 2018 / Jan. 2019****Subject: Microprocessor & Interfacing****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part-A and Any five questions from Part-B.****PART – A (20 Marks)**

- 1 Define microprocessor and microcomputer. (2)
- 2 List the machine control instructions of 8085. (2)
- 3 Differentiate between Partial and Absolute decoders. (2)
- 4 Write about the software and hardware interrupts of 8085. (2)
- 5 How many number of T-states are required for MVI A, 30H? (2)
- 6 Write a short note on IEEE 488. (2)
- 7 Describe the MN/MX mode of 8086. (2)
- 8 State the CBW and CWD instructions of 8086 microprocessor. (2)
- 9 List the stack instructions of 8086 with examples. (2)
- 10 Write an ALP to add two numbers using 8085 microprocessor. (2)

**PART – B (50 Marks)**

- 11 a) Draw and explain the Pin diagram of 8085 microprocessor. (6)  
b) Illustrate the data transfer instructions of 8085 microprocessor. (4)
- 12 a) Draw and explain the OUT instruction timing diagram. (6)  
b) Differentiate between memory-mapped I/O and peripheral I/O. (4)
- 13 Explain the 8257 DMA Controller with neat diagram using 8085. (10)
- 14 Draw and explain the 8279 keyboard/display interface. (10)
- 15 Explain the architecture of 8086 microprocessor. (10)
- 16 a) Describe the addressing modes of 8086 microprocessor. (5)  
b) Explain the arithmetic instructions and logical of 8086 with syntax and examples. (5)
- 17 Write a short note on the following  
a) Assembler Directives of 8086 (5)  
b) Use of MACROS (5)

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