Code No. 63

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) II – Semester (Backlog) Examination, May / June 2018

Subject: Fluid Mechanics – I

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

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1 State and explain Newton's laws of viscosity. 2

2 Write the relation between absolute pressure, atmospheric pressure and gauge pressure. 2

3 What is the principle of venturimeter? 2

4 A jet propelled aircraft is flying at 1000 km/hr at sea level. Calculate the Mach number at a point on the aircraft where air temperature is 20^{o}C (R = 287 J / kg K and K = 1.4). 2

5 Explain the terms Hydraulic Gradient Line (HGL) and total Energy Line (TEL). 2

6 A liquid has a specific gravity of 1.9 and kinematic viscosity of 5 stokes. What is its dynamic velocity? 3

7 Differentiate between local acceleration and convective acceleration with equation. 3

8 Sketch Bourdon Pressure Gauge. 3

9 Define Mach number and explain with a neat sketch about Mach Cone. 3

10 Show that f = 64 / Re, where f is friction factor. 3

PART – B (5x10 = 50 Marks)

11 a) State and derive Pascal's Law. 5

b) The 'x' and 'y' components of velocity in a 2-D flow field are $u = \frac{y^3}{3} + 2¡ - ¡^2 y$ and $¬ = ¡ y^2 - 2y - \frac{¡^3}{3}$, show that the flow is steady and irrotational. 5

12 a) Derive Bernoulli's energy equation by integrating Euler's equation of motion in 3-D flow. 5

b) A 45^{o} reducing bend is connected in a pipeline, the diameters at the inlet and outlet of the bend being 400 mm and 200 mm respectively. Find the force exerted by water on the bend, if the intensity of pressure at inlet of the bend is 215.8 kN/m^2. The rate of flow of water is 0.5 m^3/sec. 5

13 a) Explain the working principle of manometers and mechanical gauges. 5

b) A discharge of 15 liters per second passed over a 45^{o} sharp-edged triangular notch under a head of 25 cm. The same discharge is passed over a sharp crested rectangular notch of length 30 cm, the head being 8 cm. Calculate the value of coefficient of discharge of the two notches. What is magnitude of error in head that would cause 2 percent error in discharge in triangular notch? 5

14 a) Prove that celerity 'C' of a sound wave in a fluid is given by $C^2 = \frac{dp}{dp}$. Also find an expression for C in terms of bulk modulus 'K'. 5

b) Find the Mach number when an aeroplane is flying at 1200 km/hr through still air having a pressure of 7 N/cm^2 and temperature of $-5^{o}W$. Wind velocity may be taken as zero. Take k = 1.4, R = 287 J/kg ^{o}k. Also calculate the pressure, temperature and density of air at stagnation point on the nose of the plane. 5

15 a) Show that the maximum velocity is twice the mean velocity in laminar flow through circular pipes. 5

b) A small pipe line 10 cm in diameter and 1000 meter long carries water at the rate of 7.5 lts/sec. If the kinematic viscosity of water is 0.02 stokes, calculate the head lost wall shearing stress, center line velocity, shear stress and velocity at 4 cm from centerline and thickness of the laminar sublayer. 5

16 a) Derive an expression to find out the discharge through a ventrimeter. 5

b) Two pipes of diameters of 5 cm and 10 cm each and 200 m in length are connected parallel between two tanks having a water level difference of 10 m. If these two pipes are to be replaced by a single pipe supplying the same quantity of water, find the required diameter of the pipe. Take f = 0.01 for all pipes and neglect minor losses. 5

17 a) Derive the Hagen Poiseuille equation. 5

b) Oil of specific gravity 0.8 flows in a pipe 300 mm diameter at the of 130 liters per second and the pressure at a point A is 24.525 kPa. If the point A is 5.2 m above the datum line, calculate the total energy at a point in terms of meters of oil. 5

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Code No. 71

FACULTY OF ENGINEERING

B.E. 2/4 (EEE/ Inst.) II - Semester (Backlog) Examination, May / June 2018

Subject : Electro Magnetic Fields

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

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1 State and explain Gauss law for electrostatic fields. (2)

2 Given point P (97, 65.62^o, 109,43^o) in spherical coordinates, express 'p' in cylindrical and cartisian coordinator. (2)

3 Write the steps involved in finding the resistance of a conductor of non uniform cross section. (2)

4 Distinguish between conduction current density and displacement current density. (2)

5 Planes Z = 0 and z =4 carry current K = -10 a_x A/m and K = 10a_x A/m, respectively. Determine H at (1, 2, 3). (3)

6 Given the magnetic vector potential A = -ρ^2/4 a_z wb/m, calculate the total magnetic flux crossing the surface
$\phi = \pi/2$, $2 \le \rho \le 3$m, $0 \le z \le 6$m. (3)

7 Which of the following statements is not true of a phasor?
(a) If may be a scalar or vector.
(b) it is a complex quantity
(c) A phasor Vs may be represented as $V_0|\underline{\theta}$ and $V_0\, e^{j\theta}$ where V_0=|Vs|.
(d) It is a time-dependent Quantity (3)

8 Mention the sources of (3)
(i) Electrostatic field (ii) magnetostatic field and (iii) Electro magnetic waves
Justify your answer.

9 Define (a) Attenuation constant (b) Phase shift constant of the wave (2)

10 Deduce the relationship between velocity and phase shift constant of the electromagnetic wave. (3)

PART – B (50 Marks)

11 (a) Point charges 2 mc and -4 mc are located at (1, 4, -2) and (-3, -3, 6) respectively. Calculate the Electric force on 12 nc charge located at (0, 8, 2) and the electric field intensity at that point. (5)

(b) Given the potential $V = \frac{20}{r^2}\sin^{-}\cos¤$. Find the electric flux density D at (2, π/2, 0). Mention the concept used in solving the problem. (5)

12 (a) Define the following terms: (5)
(i) Polarization (ii) Dielectric strength and (iii) Conductivity of the material

(b) If $J = \frac{1}{r^3}(3\cos^{-} a_r + \sin^{-} a_{-})A/m^2$ calculate the current passing through (5)
(i) A hemispherical shell of radius 20 cm, $\underline{\theta} < \pi/2$, $0 < \phi < 2\pi$ and
(ii) A spherical shell of radius 8 cm.

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13 (a) Given $H_1 = -3a_x + 7a_y + 5a_z$ A/m in region $y - x - 2 \leq 0$, where $\mu_1 = 5\mu_0$. Calculate
(i) M1 and B1 (ii) H2 and B2 in region $y - x - 2 \geq 0$, where $\mu_1 = 2\mu_0$. (5)
(b) State and explain Biot-Savart's law. (5)

14 (a) State and explain continuity equation. (5)
(b) A car travels at 120 km/hr. If the earth's magnetic field is 4.3×10^{-5} Wb/m^2, find the induced voltage in the car bumper of length 1.6m. Assume that the angle between the earth's magnetic field and the normal to the car is 65^o. (5)

15 (a) State and explain poynting theorem. (5)
(b) In free space ($z \leq 0$), a plane wave with $H_i = 10 \cos (10^8 t - \beta z)a_x$ mA/m, is incident normally on a lossless medium $\varepsilon = 2\varepsilon_o$, $\mu = 8\mu_o$ in a region $z \geq 0$. Determine the reflected and transmitted waves E and H. (5)

16 (a) Derive the uniform plane equation. (5)
(b) In a lossless dielectric for which
$\eta = 60\pi$, $\mu r = 1$, $H = -0.1 \cos (wt - z)a_x + 0.5 \sin (wt - z)a_y$ A/m.
Calculate ε_r, w and E. (5)

17 Write short notes on the following:
(a) Potential gradient (3)
(b) Laplace's equation for electrostatic field (4)
(c) Analogy between electric and magnetic circuits (3)

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Code No. 77

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) II – Semester (Backlog) Examination, May / June 2018

Subject: Networks & Transmission Lines

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

Note: Answer all questions from Part – A and any five questions from Part – B. Missing data, if any, may suitably be assumed.

PART – A (25 Marks)

1) Define the parameters that describe the electrical behavior of symmetrical networks. 3
2) Explain the term image transfer constant and iterative transfer constant as applied to asymmetrical networks. 2
3) Derive the condition for a filter to lie in pass band. 3
4) What is the criterion in choosing 'm' value in m-derived filters? 2
5) What are positive real functions? List the properties of positive real functions. 3
6) The nominal characteristic resistance of a symmetrical T attenuator is 600 Ω. Design the attenuator to give an attenuation of 40 dB. 2
7) Define phase velocity and group velocity and obtain the relation between them. 3
8) What do you mean by loading of a line? How it is achieved in practice? 2
9) Specify the values of VSWR and reflection coefficient for open circuit, short circuit and matched load. 3
10) What are the disadvantages of single stub matching? 2

PART-B (50 Marks)

11. a) Prove that the propagation constant of symmetrical T network is equal to the propagation constant of symmetrical π network.
    b) Obtain the expression for image impedance Z_{i1} of asymmetrical L-network. 4

12. a) Design a m derived T section high pass filter with the following specifications. Cut-off frequency f_c = I.2 KHz, frequency of infinite attenuation f_∞ = 1.1 KHz and nominal characteristic impedance R_o = 600 Ohm.
    b) What is a composite filter? Draw its block diagram and mention the function of each section.

13. a) Obtain the first form of Cauer network for the driving point impedance. $Z(S) = 4 (S^2 + 1) (S^2 + 9) / S (S^2 + 4)$.
    b) Write a note on four terminal full series equalizer.

14. a) Prove that an infinite line is equivalent to a finite line terminated in its characteristic impedance.5
    b) A transmission line has a characteristic impedance of $710 \angle -15^0$ at 1 KHz. At this frequency, attenuation constant and phase shift constant are found to be 0.01 Neper and 0.035 Rad / Km respectively. Calculate the primary constants of the line.

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15. a) Explain how transmission line at UHF acts as circuit elements? Illustrate your answer considering open and short circuit cases.
    b) Show that quarter wave transformer act as impedance inverter.

16.a) Classify passive filters and briefly explain each type with suitable characteristics. 5
    (b) A 12 Km open wire line is terminated in its characteristic impedance. At a certain frequency the signal voltage measured at a distance of 1 Km reduces to 90 % of the sending end voltage. Determine voltage at the receiving end interms of sending end voltage.

17.a) Design an L- matching loss less network to match 100 Ω Source to 50 Ω load at 5 MHz. 5
    b) A load of (26 – j 16) Ω is connected across a 100 Ω line. Design a short circuit stub in order to provide impedance matching between the two at a signal frequency of 100 MHz. 5

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Code No: 84

FACULTY OF ENGINEERING

BE 2/4 (M/P) II - Semester (Backlog) Examination, MAY /June 2018

Subject : Basic Electronics

Time: 3 Hours **Max Marks: 75**

Note: Answer all questions from Part-A & Any Five questions From Part-B.

Part - A (25 Marks)

1. Differentiate conductor, insulator and semiconductor using energy band concept 3
2. Why half – wave rectifiers are not generally used in dc power supplies? 2
3. In a common–base configuration of a transistor ~ = 0.988. Determine I_C if I_E=1.2 mA 2
4. Why BJTs are called bipolar devices and FETs are called uni polar devices? 3
5. What is the effect of negative feedback on the bandwidth of an amplifier? 3
6. Determine the frequency of a Hartley oscillator, if L_1 = 150 µH, L_2 = 1.5 mH and C = 150 pF 3
7. Draw the equivalent Circuit of an OP-AMP 2
8. Explain the importance of NAND and NOR gates 2
9. Give the symbols for SCR, UJT, LED and photo diode 3
10. What is lissajous pattern? 2

PART – B (50 Marks)

11. a) Explain the working of a P^n diode in forward and reverse bias conditions 5
    b) Explain the working principle of a capacitor filter 5

12. Explain the operation of a transistor as an amplifier 10

13. a) A voltage shunt negative feedback amplifier has voltage gain without feedback of 500, input resistance R_i = 3KΩ, output resistance R_o = 20 KΩ and feedback ratio β=0.01 calculate A_f, R_{if} and R_{of} of amplifier with feedback. 6
    b) What is an oscillator? How it differ from an amplifier 4

14. a) Explain the working of an adder using operational amplifier 5
    b) Realize a full adder circuit using half adders 5

15. a) Explain the working of LVDT 5
    b) How LED differs from photodiode? Explain 5

16. Explain how CRO works for displaying wave forms 10

17. Write short notes on (i) Zener voltage regulator (ii) SCR 5+5

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Code No. 86

FACULTY OF ENGINEERING

B.E. 2/4 (AE) II – Semester (Main & Backlog) Examination, May / June 2018

Sub: Thermal Engineering

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

Note: Answer all questions from Part – A & any five questions from Part – B.

PART – A (25 Marks)

1 Define intensive and extensive properties with examples.

2 Differentiate between heat and work.

3 Define a heat engine, heat pump and refrigerator.

4 Define PMM-I and PMM-II.

5 Draw the P-V and T-S diagram for a Brayton cycle.

6 What are the advantages of reheating and regeneration in power cycles?

7 Mention the applications of compressed air.

8 Draw the schematic diagram of a vapour absorption refrigeration cycle.

9 Define conduction, convection and radiation and give their general equations.

10 Give the equations of LMTD for parallel flow and counter flow heat exchangers.

PART – B (5x10 = 50 marks)

11 a) Explain thermodynamic equilibrium and zeroth law of thermodynamics. 4

b) A fluid is confined in a cylinder by a spring loaded frictionless piston so that the pressure in the fluid is a linear function of the volume given by p = a+bV. The internal energy of the fluid is given by U= 34+3.15 pV, where U is in kJ, p in kPa and V in m^3. If the fluid changes from an initial state of 170 kPa, 0.03 m^3 to a final state of 400 kPa, 0.06 m^3, find the direction and magnitude of work transfer and heat transfer. 6

12 a) Explain first law and second law of thermodynamics. 5

b) Explain Carnot Cycle with the help of P-V and T-S diagrams. 5

13 a) Explain the Rankine cycle with the help of a P-V and T-S diagram. 5

b) What are the effects of regeneration, reheating and inter cooling in a Brayton cycle. 5

14 a) Define saturated liquid, wet steam, saturated (dry) steam, superheated steam and dryness fraction. Sketch them on a T-S diagram of a pure substance. 5

b) Derive an expression for the volumetric efficiency of a reciprocating air compressor. 5

15 a) Explain the working of a simple vapour compression refrigeration system with a schematic diagram. 5

b) In a double pipe heat exchanger, 10,000 kg/h of an oil having a specific heat of 2095 J/kg K is cooled from 80^0 C to 50^0 C by 8000 kg/h of water having a specific heat of 4180 J/kg K and entering at 25^0 C. If the overall heat transfer coefficient is 300 W/m^2 ^{0}C, calculate the surface area of the heat exchanger for counter flow. 5

16 a) Obtain an expression for the heat conduction through a cylinder. 5

b) Briefly describe the various dimensionless numbers used in heat transfer. 5

17 Write short notes on the following:

a) Applications of steady flow energy equation with examples. 4

b) Single acting and double acting compressors. 3

c) Different laws of radiation. 3

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Code No. 91

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) II – Semester (Main & Backlog) Examination, May / June 2018

Subject: Microprocessor & Interfacing

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

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1	Differentiate between microprocessor and microcontroller.	2
2	Write a short note on partial and absolute addresses.	2
3	Describe the LDA and LXI instructions.	2
4	Write an ALP to find the smaller of two numbers using 8085.	2
5	Write the differences between peripheral mapped I/0 and memory mapped I/0.	3
6	Define DMA.	2
7	Write a short note on RS – 232.	3
8	List the addressing modes of 8086.	3
9	Write a short note on the internal memory of 8051.	3
10	Write an ALP to transfer block of data using 8051.	3

PART – B (5x10 = 50 Marks)

11	Draw the architecture of 8085 micro processor and explain.	10
12	a) Explain A/D converter using 8085 micro process0r.	6
	b) Define stack and write about the stack instructions with examples.	4
13	Draw and explain the functional block diagram of programmable communication interface.	10
14	Explain the 8253 with a neat diagram.	10
15	a) Draw and explain the interfacing LCD using 8051.	5
	b) Illustrate the 8051 addressing modes.	5
16	Explain the instruction set of 8086 micro processes with examples.	10
17	Write a short note on the following:	
	a) 80386 micro processor	5
	b) IEEE 488.	5

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Code No. 96

FACULTY OF INFORMATICS

B.E. 2/4 (IT) II-Semester (Backlog) Examination, May / June 2018

Subject : Computer Organization Microprocessors

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

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Define subroutine. Give any two examples of subroutine.	2
2	Explain markable and non-markable interrupts.	2
3	Write any two differences between microprocessor and micro controller.	2
4	What is the function of Bus. Draw the structure of single bus.	3
5	Describe RAL, RLC rotate instruction.	3
6	Calculate the average execution time experienced with 2 caches (1 primary + 1 secondary) presented in the processor. If M = 1m sec, h = 0.7, c_1 = 0.1, c_2 = 0.2 (h_1 and h_2).	3
7	Write about modes of transfer of 8251.	3
8	Define virtual memory.	2
9	Write an assembly language program to subtract two 8-bit nos.	3
10	Explain the function of SP (stack pointer), PC (program counter).	2

PART – B (50 Marks)

11	What are the various modes of USART (8251)? Explain with block diagram.	10
12	i) Interprete the various types of computer.	5
	ii) How the performance of cache can be measured?	5
13	i) Explain the operation of Read Only Memory (ROM).	5
	ii) Analyse the memory hierarchy.	5
14	Define Addressing mode. Analyse the various addressing modes of 8085.	10
15	Write the operation of A/D converter and its interfacing with 8085.	10
16	Explain the operation of IEEE 488 (GPIB) in detail.	10
17	Write short notes on : i) Virtual memory ii) SRAM (Static RAM)	10

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