

141 PU Ph.D Electrical & Electronics Engineering

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196 PU_2016_141_E

Steady state stability of a power system is the ability of a power system to:-

- maintain frequency exactly at 50Hz
- maintain a spinning reserve margin at all times
- maintain voltage at the rated voltage level
- maintain synchronism between machines and on external tie lines

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An electromagnetic field is radiated from:-

- a conductor carrying a dc current
- a capacitor with a dc voltage
- a stationary point charge
- an oscillating dipole

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Shunt reactors are sometimes used in a high voltage transmission system to:-

- limit the short circuit current through the line
- compensate for the series reactance of the line under heavily loaded conditions
- limit over voltages at the load site under lightly loaded conditions
- compensate for the voltage drop in the line under heavily loaded conditions

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127 PU_2016_141_E

Neglecting all losses the developed torque of a dc separately excited motor operating under constant terminal voltage is related to its output power (P) as under:-

- T independent of P
- $T \propto P^3$
- $T \propto \sqrt{P}$
- $T \propto P$

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Ratio of rotor reactance X to the rotor resistance R for a two phase servo motor:-

- is less than that of a normal induction motor
- is greater than that of a normal induction motor
- is equal to that of a normal induction motor

- may be lesser or greater than that of a normal induction motor

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A parallel plate capacitor has an electrode area of 100mm^2 , with a spacing of 0.1mm between the electrodes. The dielectric between the plates is air with a permittivity of $8.85 \times 10^{-12}\text{F/m}$. The charge on the capacitor is 100 V . The stored energy in the capacitor is:-

- 22.1 nJ
 44.3 nJ
 8.85 pJ
 440 pJ

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121 PU_2016_141_E

Which of the following statements holds for the divergence of electric and magnetic flux densities?

- it is zero for electric flux densities
 these are zero for static densities but non zero for time varying densities
 it is zero for magnetic flux densities
 both are zero

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217 PU_2016_141_E

High voltage DC transmission is mainly used for:-

- eliminating reactive power requirement in the operation
 interconnecting two systems with the same nominal frequency
 bulk power transmission over long distances
 minimizing harmonics at the convertor stations

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214 PU_2016_141_E

In load flow analysis the load connected at a bus is represented as:-

- constant current drawn from the bus
 voltage and frequency dependent source at the bus
 constant real and reactive power drawn from the bus
 constant impedance connected at the bus

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213 PU_2016_141_E

Base load power plants are P - wind farms, Q run of river plants, R- nuclear power plants S- diesel power plants:-

- Q and R only

- P, Q and S only
- P,R and S only
- P, Q and R only

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190 PU_2016_141_E

In order to have a lower cost of electrical energy generation:-

- the load factor and diversity factor should be high
- the load factor and diversity factor should be low
- the load factor should be high and the diversity factor should be low
- the load factor should be low and the diversity factor should be high

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126 PU_2016_141_E

A dielectric slab with 500 mm x 500mm cross section is 0.4m long. The slab is subjected to uniform electric field of $E=6a^x + 8a^y$ kV/mm. The relative permittivity of the dielectric material is equal to 2. The value of constant ϵ_0 is equal to 8.85×10^{-12} F/m. The energy stored in the dielectric in Joules is:-

- 885
- 8.85×10^{-11}
- 8.85
- 8.85×10^{-5}

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197 PU_2016_141_E

The angle δ in the swing equation of a synchronous generator is the:-

- angle between stator voltage and current
- angular displacement of an axis fixed to the rotor with respect to a synchronously rotating axis
- angular displacement of the rotor with respect to the stator
- angular displacement of the stator mmf with respect to a synchronously rotating axis

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The rated voltage of a three phase power system is given as:-

- RMS phase voltage
- peak line to line voltage
- RMS line to line voltage
- peak phase voltage

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108 PU_2016_141_E

The RMS value of a half wave rectified symmetrical square wave current of 2A is:-

- $\sqrt{2}A$
- $1/\sqrt{2}A$
- $\sqrt{3}A$
- $1A$

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An industrial consumer has a daily load factor of 2000 KW, 0.8 lag for 12 hours and 1000 KW UPF for 12 hours. The load factor is:-

- 0.5
- 2 .0
- 0.6
- 0.75

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111 PU_2016_141_E

If a two port network is passive, then we have, with the usual notation the following relationship:-

- $h_{1,1} = h_{2,2}$
- $h_{1,2} = h_{2,1}$
- $h_{1,1} h_{2,2} - h_{1,2} h_{2,1} = 1$
- $h_{1,2} = - h_{2,1}$

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Bulk power transmission over long HVDC lines are preferred on account of:-

- simple protection
- minimum line power losses
- No harmonic problems
- low cost of HVDC terminals

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The conductors of 10 km long, single phase two wire line are separated by 1.5m. the diameter of each conductor is 1cm. If the conductors are of copper, the inductance of the circuit is:-

- 23.8 mH
- 50.0 mH
- 19.6 mH
- 45.3 mH

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A passive two port network is in a steady state compared to its input, the steady state output can never offer:-

- higher voltage
- greater power
- lower impedance
- better regulation

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In a uniform electric field, the field lines and equipotentials:-

- intersect at 30°
- are orthogonal
- intersect at 45°
- are parallel to one another

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101 PU_2016_141_E

A voltage waveform $V(t) = 12t^2$ is applied across 1 H inductor for $t \geq 0$ with initial current through it being 0. The current through the inductor for $t \geq 0$ is given by:-

- $4t^3$
- $24t$
- $12t$
- $12t^3$

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Two parallel wires separated by a distance are carrying current I in the same direction. The magnetic field along a line running parallel to these wires and midway between them:-

- is zero
- depends upon permeability of medium between the wires
- depends upon d
- depends upon I

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For enhancing the power transmission in a long EHV transmission line, the most preferred is to connect a:-

- shunt capacitive compensator at the receiving end
- series capacitive compensator in the line
- series inductive compensator in the line

- shunt inductive compensator at the receiving end

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The concept of an electricity short, medium and long line is primarily based on the:-

- nominal voltage of the line
- wave length of the line
- physical length of the line
- power transmitted over the line

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Corona losses are minimized when:-

- conductor size is reduced
- smoothness of conductor is reduced
- sharp points are provided in the line hardware
- current density in conductors is reduced

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102 PU_2016_141_E

How many 200 W/220V incandescent lamps connected in series would consume the same total power as a single 100W/220V incandescent lamp:-

- not possible
- 4
- 2
- 3

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The undesirable property of an electrical insulating material is:-

- high insulation resistivity
- high relative permittivity
- high dielectric strength
- high thermal conductivity

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An ideal voltage source will charge an ideal capacitor:-

- exponentially
- in infinite time

- in finite time
- instantaneously

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110 PU_2016_141_E

A balanced delta connected load of $(8+j6) \Omega$ per phase is connected to a 400V, 50Hz, 3 phase supply lines if the input power factor is to be improved to 0.9 by connecting a bank of star connected capacitors, the required kVAR of the bank is:-

- 42.7
- 28.8
- 10.2
- 38.4

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HVDC transmission is preferred to EHP-AC because:-

- HVDC terminal equipment are inexpensive
- harmonics problem is avoided
- system stability can be improved
- VAR compensation is not required in HVDC systems

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131 PU_2016_141_E

A 1.8° step 4-phase stepper motor has a total of 40 teeth on 8 poles of stator. The number of motor teeth for this motor will be:-

- 50
- 80
- 100
- 40

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The line integral of the vector potential A around the boundary of a surface S represents:-

- flux density in the surface S
- current density
- flux through the surface S
- magnetic density

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185 PU_2016_141_E

Series capacitive compensation in EHV transmission line is used to:-

- improve the stability of the system
- reduce the voltage profile
- reduce the line loading
- improve the protection of the line

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187 PU_2016_141_E

Total instantaneous power supplied by a three phase ac supply to a balanced RL load is:-

- zero
- pulsating with zero voltage
- pulsating with non zero voltage
- constant

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195 PU_2016_141_E

During a disturbance on synchronous machine, the rotor swings from A to B before finally settling down to a steady state at point C on the power angle curve. The speed of the machine during oscillation is synchronous at point(s):-

- only at C
- B and C
- A and C
- A and B

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218 PU_2016_141_E

The per unit parameters for a 500MVA machine on its own base are Inertia $M = 20$ p.u., reactance $X = 2$ p.u.; The p.u. values of inertia and reactance on 100MVA common base, respectively are:-

- 4, 0.4
- 100, 0.4
- 4, 10
- 100, 10

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Which material is used in controlling chain reaction in a nuclear reactor?

- Thorium
- Beryllium
- Boron
- Heavy water

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132 PU_2016_141_E

The dc motor which can provide zero speed regulation at full load without any controller is:-

- differential compound
- shunt
- cumulative compound
- series

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130 PU_2016_141_E

Which type of motor is most suitable for computer printer drive?

- shaded pole motor
- hysteresis motor
- stepper motor
- reluctance motor

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120 PU_2016_141_E

The inductance of L arm solenoid of length 1000 mm wound uniformly with 3000 turns on a cylindrical paper tube of 60 mm diameter is:-

- 3.2mH
- 3.2H
- 32.0 mH
- 3.2 μ H

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193 PU_2016_141_E

For a fault at terminals of synchronous generator, the fault current is maximum for a:-

- line to ground fault
- three phase to ground fault
- line to line fault
- three phase fault

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211 PU_2016_141_E

For harnessing low variable water heads the suitable hydraulic turbine with high percentage of reaction and runner adjustable values is:-

- Pelton
- Impeller
- Francis

- Kaplan

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183 PU_2016_141_E

The insulation strength of an EHV transmission line is mainly governed by:-

- harmonics
- load power factor
- corona
- switching overvoltage

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133 PU_2016_141_E

A 4 point starter is used to start and control the speed of a:-

- dc shunt motor with armature resistance control
- dc compound motor
- dc shunt motor with field weakening control
- dc series motor

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122 PU_2016_141_E

The concept of an electrically short, medium and long line is primarily based on the:-

- wave length of the line
- nominal voltage of the line
- physical length of the line
- power transmitted over the line

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Out of the following plant categories i. nuclear, ii. Run-of-river, iii. Pump storage, iv. Diesel, the base load power plants are:-

- i, ii and iv
- i, iii and iv
- i and ii
- ii and iii

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129 PU_2016_141_E

The torque characteristics of a repulsion motor resembles which of the following dc motor characteristic?

- shunt
- compound

- series
- separately excited

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207 PU_2016_141_E

Keeping in view the cost and overall effectiveness, the following circuit breaker is best suited for capacitor bank switching:-

- oil
- air blast
- vacuum
- SF₆

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125 PU_2016_141_E

Two point charges Q₁=10 μc and Q₂=20μ c are placed at co-ordinates 91,1,00 and (-1,-1,00 respectively. The Z=20 will be:-

- 15.0 μc
- 13.5 μc
- 7.5 μc
- 22.5 μc

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113 PU_2016_141_E

A major advantage of active filters is that they can be realized without using:-

- inductors
- op-amps
- resistors
- capacitors

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192 PU_2016_141_E

For an unbalanced fault, with paths for zero sequence currents at the point of fault:-

- the negative sequence voltage is minimum and zero sequence voltage is maximum
- the negative and zero sequence voltages are minimum
- the negative sequence voltage is maximum and zero sequence voltage is minimum
- the negative and zero sequence voltages are maximum

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210 PU_2016_141_E

In thermal power plants the pressure in the working fluid cycle is developed by:-

- super heater

- turbine
- condenser
- feed water pump

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194 PU_2016_141_E

A transient stability of the power system can be effectively improved by:-

- increasing the turbine valve opening
- phase shifting transformer
- excitation
- single pole switching of circuit breakers

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219 PU_2016_141_E

Feed back control systems are:-

- less sensitive to feedback path parameter changes than to forward path parameter changes
- insensitive to both forward and feedback path parameter changes
- less sensitive to forward path parameter changes than to feedback path parameter changes
- equally sensitive to forward and feedback path parameter changes

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119 PU_2016_141_E

An electron with velocity u is placed in an electric field, E , and magnetic field, B . the force experienced by the electron is given by:-

- $-e(uxE+B)$
- $-e(E+uxB)$
- $-euxB$
- $-eE$

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135 PU_2016_141_E

Two transformers of the same type using the same grade of iron and conductor materials are designed to work at the same flux and current densities, but the linear dimensions of one are two times those of the other in all respects. The ratio of KVA of th

- 4
- 8
- 16
- 2

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199 PU_2016_141_E

A Buchholz relay is used for:-

- protection of a transformer against external faults
- protection of a transformer against both internal and external faults
- protection of a transformer against all internal faults
- protection of induction motor

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209 PU_2016_141_E

In a thermal power plant the feed water coming to the economizer is heated using:-

- H.P. steam
- direct heat in the furnace
- flue gases
- L.P. steam

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109 PU_2016_141_E

In a series RLC circuit at resonance , the magnitude of the voltage developed across the capacitor:-

- can be greater than the input voltage, however, it is 90° out of phase with the input voltage
- is always zero
- can be greater than the input voltage and is in phase with the input voltage
- can never be greater than the input voltage

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258 PU_2016_141_M

The heart sounds are recorded by:-

- Angio cardiograph
- Electro cardiograph
- Phono cardiograph
- Endoscope

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254 PU_2016_141_M

The instrument used to scan the soft tissues:-

- CT
- Ultrasound
- MRI
- All the above

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245 PU_2016_141_M

Which of the following essential features is possessed by an indicating instrument:-

- Damping device
- Controlling device
- Deflecting device
- All of the above

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232 PU_2016_141_M

A 120Ω resistor must carry a maximum current of 25 mA. Its rating should be at least 4.8 W:-

- 4.8 W
- 480 mW
- 15 mW
- 150 mW

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251 PU_2016_141_M

The capacitance microphone is used for the detection of:-

- Abdominal sound
- Lung Sound
- Heart Sound
- Blood flow sound

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223 PU_2016_141_M

A unity feedback system, having an open loop gain becomes stable when $G(s)H(s)=K(1-s)/(1+s)$:-

- $|K| > 1$
- $|K| < 1$
- $K > 1$
- $K < -1$

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252 PU_2016_141_M

Piezo-electric transducers converts electrical energy to:-

- Torque
- Displacement
- Light
- Vibration

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236 PU_2016_141_M

The positive potential of the cell membrane during excitation is:-

- Drift potential
- Diffusion potential
- Action potential
- Passive potential

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259 PU_2016_141_M

The T wave is produced during:-

- Atrial repolarization
- Repolarization of the ventricles
- Atrial depolarization
- Depolarization of the ventricles

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221 PU_2016_141_M

In the formation of Routh-Hurwitz array for a polynomial, all the elements of a row have zero values. This premature termination of the array indicates the presence of:-

- only one root at the origin
- only positive real roots
- imaginary roots
- only negative roots

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233 PU_2016_141_M

A bulb in a staircase has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by any one of the switches irrespective of the state of the other switch. The logic of switching of the bulb resembles:-

- NAND gate
- OR gate
- XOR gate
- AND gate

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224 PU_2016_141_M

Consider the unit step response of a unity feedback control system whose open loop transfer function is $G(s) = 1/s(s+1)$, the maximum overshoot is equal to:-

- 0.143
- 0.173
- 0.163

- 0.153

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246 PU_2016_141_M

In a portable instrument, the controlling torque is provided by:-

- spring
- eddy currents
- gravity
- all of the above

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253 PU_2016_141_M

Self generating type transducers are _____ transducers.

- Active
- Passive
- Active & Passive
- None of the above

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248 PU_2016_141_M

How many times do we respire in a minute:-

- 30-35 breaths /min
- 10-12 breaths/ min
- 20-25 breaths /min
- 15-20 breaths/min

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222 PU_2016_141_M

The number of roots on the equation $2s^4 + s^3 + 3s^2 + 5s + 7 = 0$ that lie in the right half of s-plane is:-

- zero
- one
- two
- three

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231 PU_2016_141_M

The ability of a material to remain magnetized after removal of the magnetizing force is known as:-

- reluctance
- permeability
- retentivity

- hysteresis

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249 PU_2016_141_M

What is the instrument used to analyse the working of heart:-

- EEG
- EMG
- EOG
- ECG

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229 PU_2016_141_M

Consider a second order system whose state space representation is of the form $\dot{X} = AX + BU$. If $X_2(t) = X_2(t)$, then system is:-

- uncontrollable
- unstable
- controllable
- observable

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244 PU_2016_141_M

The closed loop pole of a stable second order system could be:-

- Both real and positive
- One real positive and the other real negative
- Both real and negative
- Complex conjugate with positive real parts

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285 PU_2016_141_D

The octal equivalent of hexadecimal number AB.CD is:-

- 253.632
- 253.314
- 526.632
- 536.314

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264 PU_2016_141_D

What is the cause for light or dark recording of EEG?

- Pen is not touching properly
- Lead connection problem
- Incorrectly loaded paper
- Ink tubes are clogged

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263 PU_2016_141_D

Match the following

- | | |
|-----------------------------|------------------------------|
| 1. Electron microscope – | (A) Electron gun |
| 2. Oscilloscope – | (B) Condensing magnetic lens |
| 3. Galvanometric recorder – | (C) Recording head |
| 4. Magnetic recorder – | (D) Drive motor |

- 1-B, 2-A, 3-D, 4-C
- 1-D, 2-C, 3-B, 4-A
- 1-A, 2-B, 3-C, 4-D
- 1-C, 2-D, 3-A, 4-B

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288 PU_2016_141_D

The microprocessor interrupt which has the highest priority is:-

- TRAP
- RST 6.5
- INTR
- RST 5.5

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274 PU_2016_141_D

In a 3-phase semiconverter, for firing angles less than or equal to 60° , freewheeling diode conducts for:-

- 90°
- 0°
- 30°
- 60°

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298 PU_2016_141_D

A potentiometer is basically a:-

- Null type instrument
- Deflection as well as null type instrument
- Digital instrument

- Deflection type instrument

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284 PU_2016_141_D

A dual slope analog to digital converter uses an N-bit counter. When the input signal V_a is being integrated, the counter is allowed to count up to a value:-

- Equal to $2N-1$
- Inversely proportional to V_a
- Equal to $2N-2$
- Proportional to V_a

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289 PU_2016_141_D

Number of ports available in 8255 programmable peripheral interface is:-

- 4
- 3
- 1
- 2

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295 PU_2016_141_D

A 1.8 degrees step, 4 phase stepper motor has a total of 40 teeth on 8 poles of stator. The number of rotor teeth for this motor will be:-

- 40
- 50
- 80
- 100

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273 PU_2016_141_D

A four quadrant operation requires:-

- two full converters connected in parallel
- two full converters connected back to back
- two semi converters connected back to back
- two full converters in series

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287 PU_2016_141_D

Which of the following 8085 microprocessor instruction will not clear the Accumulator content:-

- SUB A
- MVI A,00

- ADD A
- XRA A

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269 PU_2016_141_D

Which of the following statement is true?

- All instructions affect the flags
- PC points to the last instruction that was executed
- Stack works on the principle of lifo
- ROM is read/write memory.

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283 PU_2016_141_D

The output of a logic gate is '1' when all its inputs are at logic '0'. The gate is either

- a NOR or EX-OR gate
- a NOR or EX-NOR gate
- a AND or EX-NOR gate
- a NAND or EX-OR gate

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261 PU_2016_141_D

For biomedical applications the mostly used amplifier is:-

- Single ended amplifier
- Differential amplifier
- Chopper amplifier
- Inverting operational amplifier

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271 PU_2016_141_D

A single phase voltage controller feeds power to a resistance of 10Ω . The source voltage is 200 V rms.

For a firing angle of 90° the rms value of thyristor current is:-

- 15 A
- 5 A
- 20 A
- 10 A

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296 PU_2016_141_D

In a transformer, zero voltage regulation at full load is:-

- Possible at leading power factor load

- Possible at lagging power factor load
- Possible at unity power factor load
- Not possible

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286 PU_2016_141_D

The content of the accumulator in an 8085 microprocessor is altered after the execution of the instruction:-

- ORA A
- ANI 5C
- CMP C
- CPI 3A

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272 PU_2016_141_D

A DC chopper is fed from 100 V dc. Its load voltage consists of rectangular pulses of duration 1 ms in an overall cycle time of 3 ms. The average output voltage and ripple factor for this chopper are respectively:-

- 33.33 V, 1
- 33.33 V, 1.5
- 25 V, 1
- 50 V, 1.5

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297 PU_2016_141_D

In a constant voltage transformer the output voltage remains constant due to:-

- Input inductor
- Capacitor
- Saturation
- Tapped winding

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262 PU_2016_141_D

Pre amplifier isolation in ECG circuit is to:-

- Decrease output impedance
- Decrease input impedance
- Increase output impedance
- Increase input impedance